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Electricians

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JOHNNY BULL TO JONATHAN.

The effusion in your paper, from a C H operator,
Is so full of friendly feeling for the fast-speed Wheatstone biz,
That we Britishers, replying, wish to let know we're dying
For an early introduction, so that we may see his phiz.

As a rule, we think our mission is regarded with suspicion
By far the greater number of your operating force;
But they're very much mistaken if they think our souls are achin'
To effect the demolition of the old familiar Morse.

We, like you, have loved the sounder, and have no desire to *ground* her;
We have listened—aye! in dreams, too!—to her sweet and resonant tone;
And her days shall ne'er be numbered, nor her usefulness encumbered,
Even though the *busy* wires be commanded by Wheatstone.

For ourselves, our hands fraternal we extend through this great journal;
May our friendship, newly formed, ne'er lose its continuity;
Let us all be knit together, sirs, in foul or fairest weather,
So that, wheresoe'er we wander, we'll be still in unity.

There is Frier, from sunny Lester, who is famous as a tester;
He can talk with any savant about quantitative lore;
He's an Edison admirer, and a very deep inquirer,
And will one day make his mark, perhaps, on this Atlantic shore.

Then there's Finn, whose fund of learning you can hardly help discerning;
From Newcastle-upon-Tyne he comes—and nothing there is slow;
He'll preside with credit over the relays, and ever hover
O'er the spirit of telegraphy in frigid Buffalo.

Then comes Mitchell, our mechanic, who in chemistry organic
Can confute the greatest amateur that ever yet was born;
He can fix a perforator, and adjust a commutator,
A receiver or transmitter, and can also—take a horn.

Then here's jovial Tom O'Reilly—not the one they "speak of highly,"
But an upright, thorough fellow, from Auld Edinboro' toon;
He can wrestle with a lawyer, and appreciate Tom Soyer,
And never fails, when asked, to warble "Sweet Kathleen Aroon."

Fred Thomas, too, from Dublin, who, while there, was always troublin'
With the antiquated fossils who command the G. P. O.;
But his troubles now are over, and he finds himself in clover,
In the far less irksome service of the Western Union Co.

Then there's Smith, from hot Havana, where they're always drinking "caña;"
He's a Briton (you can rest assured) of no uncertain grade;
He's a double-barreled puncher, and an epicurean luncher,
And his telegraphic stories leave Munchausen in the shade.

Then there's Flavin, from East Passage, who can swallow any "sassage"
That was ever manufactured in the burly Teuton's land;
He's a man of parts, is Walter, and was never known to falter,
Only when some evil genius put a corn-cob in his hand!

Murdock, too, from Bonnie Dundee, who goes off to kirk each Sunday—
Though for what is an enigma which to solve we ever fail—
He can dance "Green Grows the Rashes," and is fond of making "mashes,"
And his tongue can utter words peculiar only to the Gael.

Then there's Pritchard and McGinness (and they bring us near the finis);
They are Englishmen, and 'twixt themselves can very well agree;
And there's Holland, from old Ireland, who, before he left the mireland,
Was accustomed to "officiate," he tells us, "at Tralee."

Now we guess you're fully posted, and we hope you won't be "roasted,"
For we've taken up a lot of time to tell you who is who.
Mr. Editor, forgie us, and we hope that when you see us,
We will have—well, never mind—you've got the wink! Till then,

ADIEU.

Electric Lighting.—XV.

COMMUTATOR SPARKING.

It is well known that during the operation of dynamo-electric machines sparks occur at the commutator as each segment leaves the brush. These sparks soon wear out the commutator at certain points, so as to render its surface uneven and rough, thus making the contact of the brushes more uncertain, because it takes place at a smaller number of points. The resistance therefore increases at this part of the circuit, and, besides, these variations of the surface of

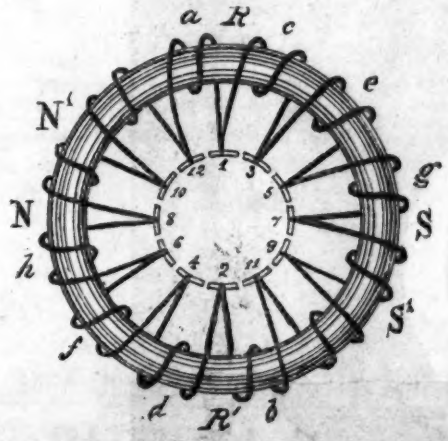

FIG. 61.

the commutator make the tendency to sparking still greater. Many persons would naturally suppose that the wear and tear of the commutator and brushes is due to simple friction between them, but in point of fact this friction will scarcely suffice to produce any unevenness. As long as no sparks appear everything runs smoothly, and neither commutator nor brush shows any symptoms of wear, even for days; but once the breach is made by a spark taking place at the same spot several times successively, then it will not be long before grooves and ridges begin to appear on the commutator, with the well-known annoying results. The attendant who has often had the troublesome experience of having his brushes "spit fire," and wear out unevenly, so as to require to be cut every day, can tell better than anybody else of the inconvenience of a rough commutator. When once the commutator begins to spark badly he knows that an era of vexation opens for him, and that the trouble will last until the commutator has become even and smooth once more, which, in many cases, has to be done

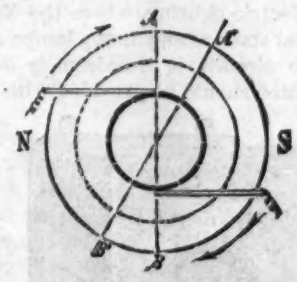

FIG. 62.

by turning it down. It is safe to say, in short, that the greatest source of trouble in working dynamo-electric machines comes from the commutator, which exacts constant and assiduous attention.

The condition of the current seems to affect the sparks. It would seem that with a perfectly smooth commutator, and with the brushes perfectly adjusted at the exact point of reversal, no sparks could occur, but instead of that a succession of sparks appears at irregular intervals, as the current wavers in consequence of the slip of a belt, the flicker of a lamp, etc. Now, a spark in this case shows that the section of the armature which is passing by the collector or brush was not inactive, but that, on the contrary, it was giving current while passing at that point, as if the point of reversal had become changed. Either it had already passed the point of reversal or else it had not reached it. Let us make this clear by means of a diagram (Fig. 61). Supposing the field of force to be placed in a horizontal line $N S$, then the collectors must be placed on the segments 1, 2 of the commutator, which correspond to the point of reversal $R R'$. Now, if the armature is moving in the direction of the hands of a watch, as soon as the sections $a b$ of the armature reach the dead point they will be short-circuited for a moment, because one brush will touch both the segments 1 and 12 above, while the other will touch both 2 and 4 below. As the rotation continues, the segments 1 and 2 will leave the collectors altogether, thus letting the section a form a part of the right-hand circuit, and the section b a part of the left-hand circuit. But as these sections $a b$ were not producing any current at the moment the collectors 1 and 2 left contact, no spark could take place. This is the normal operation, which is supposed to take place when everything is properly arranged; each section is short-circuited for a brief instant, just as it passes the point of reversal. Suppose, however, that we vary the conditions purposely by moving each brush forward a little, so that, as the armature now stands, the upper one would touch segments 1 and 3, short-circuiting section c, while the lower one would touch 2 and 4, short-circuiting section d. Now, we must recollect that the points at which the sections $c d$ would be passive are still at $R R'$; the consequence is that if the brushes touch at the points just indicated, the sections $c d$ are producing current while being short-circuited; and such would be the case for every succeeding section as it passed that point. The electromotive force of induction is not very high in this local closed system, because it is that due to the length of wire in that section only, and, moreover, the field is weaker there, being near the point of reversal; but the resistance which that E.M.F. has to overcome is also very low, for it is only its own wire resistance, since the copper brush practically joins the two ends together at the commutator. Thus an electromotive force of only 1 voit, acting on a resistance as low as .1 ohm, would give rise to a current of 10 ampères. Now, as the segments 3 and 4 leave contact with the brush, these "parasite" circuits in sections $c d$ are opened, and a strong spark passes between the segments and the collectors; and the same spark will occur as each section passes there in turn. Of course, if the brushes are so placed that this local circuit is closed a little near $R R'$, or just as the induction in the sections short-circuited is disappearing entirely, then the spark will have much less intensity; while, on the other hand, the farther away from $R R'$ the brushes are made to touch the commutator, the more powerful will be the sparks produced. It is scarcely necessary to add that moving the brushes out of their proper point of equilibrium in the other direction will also give rise to sparks at the commutator. It is also needless to observe that any such current in these parasite circuits as is evinced in the sparks represents a loss of energy without useful return, which is another excellent reason why sparking is undesirable.

DISSYMMETRY OF COMMUTATION.

This phenomenon of local action is what actually takes place when the commutator sparks, only in this case it is not the brushes that shift, but the *field*. It appears to be dragged or pushed along in the direction of the rotation, so that, under certain circumstances, it assumes the position $N' S'$ relatively to the armature, thus necessitating the movement of the brushes forward. Fig. 62 will assist us in defining this fact further. The field of force magnets, of course, remain in the same position $N S$; but the lines of force become swerved out of their normal distribution, as we shall see, and the line of reversal, instead of being at $A B$, tends to become shifted more or less towards $A' B'$, and in practice the collecting brushes have to be moved forward, so as to touch the commutator at those points, to avoid sparking, the amount of displacement varying with the conditions. It is for this reason that in all dynamo-electric machines both of the collectors are fastened to a common yoke, which turns on the same centre as the armature, so that both brushes may always move at once and equally, and thus touch at diametrically opposite points.

The explanation of these variations of adjustment depends on one fact mainly, which is that the core of the armature is capable of exerting magnetic reaction on the lines of force of the field. In Fig. 35 we showed the magnetic spectrum of a ring armature revolving in a magnetic field while the circuit was open, so that no induction took place; the field was equal in distribution on both sides, the lines of commutation being evidently midway between each pole. But the moment currents begin to circulate in the wire around the ring, their reaction brings about a very remarkable change; for these currents, while circulating around the core of the armature on their way out, render it magnetic, and this magnetism immediately exerts an influence on the distribution of the lines of force in the field. The currents in all the sections on each half of the armature circulate in a uniform direction. Supposing the current to pass from the lower to the upper part on each side, we see at once that we have, in this case, two similar semi-circular magnets, having a common *N* pole at *R'*, and a common *S* pole at *R*, and these poles will remain at that point while the armature rotates, because the currents on either side depend on the position of the collectors. Now, what takes place is this: those lines of force of the ring which have *S* polarity tend to blend with the *N* lines of the magnetic field by fusion with them, according to Faraday's second law, while the lines of force of *N* polarity tend to do the same with the *S* lines of the magnetic field. Thus in Fig. 61 the lines of force *N* are pushed forward from *R'* and attracted by those at *R* which are of *S* polarity; while the reverse takes place for the *S* lines of the magnetic field which are attracted by the *N* lines at *R'*. To these effects must be added the direct reaction of the currents on the field of force, which also tends to further the same result. Fig. 63 shows the spectrum produced in such a case, and shows how the field of force becomes severed by the reaction of the lines of magnetic force due to the currents. By comparison with Fig. 35 it will be clearly seen that the line of reversal in this case is inclined from the vertical, and corresponds to *A' B'* in Fig. 62, and that the brushes would have to touch at these points in order to obviate sparking.

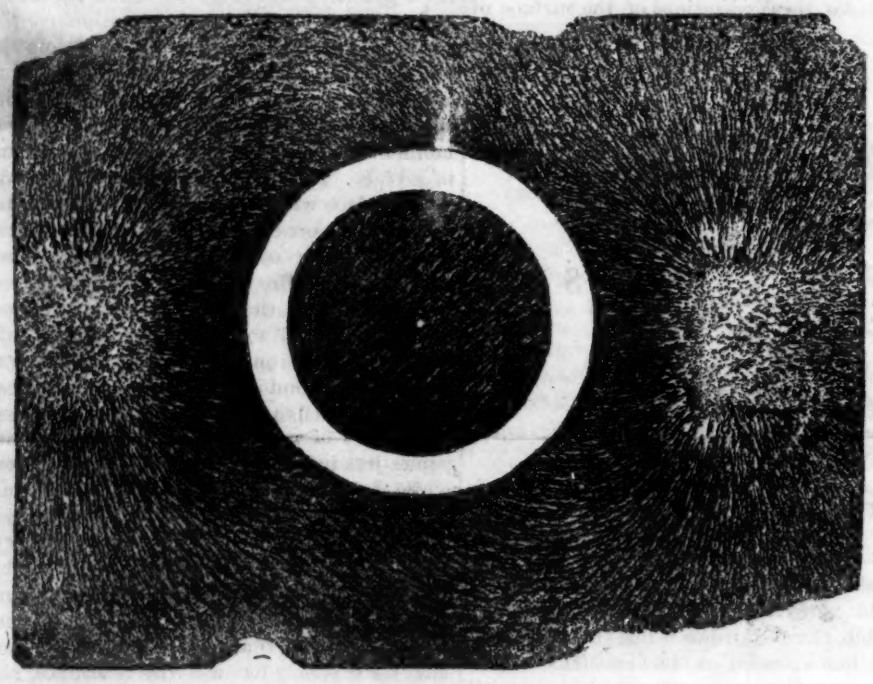

FIG. 63.

Now, what causes this variation of the line of commutation is a difference in the power of the magnetic field and core of the armature, for, evidently, if the power of the magnetic field remained constant, and if the reactive power of the armature also remained the same, the displacement, when once established, would be permanent. But suppose the current changes suddenly, by a variation of resistance in the circuit. If this fluctuation makes the current greater than before, then the reactive power exerted on the field of force is greater, and the line of commutation moves forward, and sparking results, unless the brushes are moved at once to that point. On the contrary, anything which will diminish the current passing lessens this reaction of the armature, and the line of commutation moves back towards the theoretical point. If the field of force were infinitely strong, then the reaction of the armature would be entirely overcome, and the line of commutation would be at the exact theoretical point. In practice this is not realized, however; the line of commutation is always a little inclined towards *A' B'*. The electromotive force of machines increases with their velocity of rotation, and, consequently, the displacement of the brushes is greater with the higher speeds, as well as with diminutions of resistance,

A displacement of the collectors is also required to prevent sparking when the machines are used as *motors;* though in this case the displacement is in the opposite sense to the rotation, as shown by the line *C' D'*, in Fig. 64.

We must bear in mind that in the ordinary dynamo-electric machine the current of the armature, by its magnetic effects, opposes the motion of the armature and would of itself make it move the other way, and so, when we pass a current through this machine in the same direction as it would itself produce one, its armature moves in a contrary direction, because the shortening of the lines of force between *N* and *R*, and between *S* and *R'*, tends to make it move in this direction. Accordingly, the displacement of the field, when considered in relation to the ring and the poles of the field magnets, is in the same direction as when

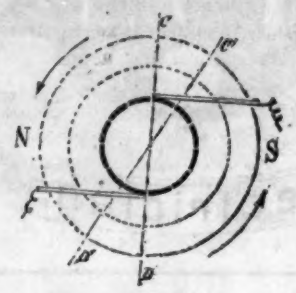

FIG. 64.

the machine was used as a generator; but when considered with respect to the rotation of the armature it is different. But by the contrary rotation of the armature an induction takes place in the armature that would naturally tend to cause a displacement in its forward direction of rotation, and as this would make the line of commutation incline the other way, it amounts to the same thing as lessening the original displacement, and makes the line of commutation. *C' D'* agree more nearly with the theoretical one *C D*, and the greater the speed the more nearly the two will coincide. The more slowly the motor moves (as when it is heavily loaded) the greater will be the displacement or "lead" of the brushes necessary to avoid sparking. In these explanations we have adhered to armatures of the ring type, for convenience; it will be understood that the observations all apply to other armatures as well. With polar armatures, the line of displacement would of course be at right angles to that of ring and drum or cylindrical armatures.

C. O. M.

The Weston Cut-off Box.

In systems of electric lighting, where the lights are supplied from central stations and many lamps are placed in series in the same circuits, it is extremely desirable that each building lighted should be provided with a simple and efficient means of entirely disconnecting it from the circuit, without interfering with the remaining lights in the same circuit.

FIG. 1.

The National Board of Fire Underwriters has recognized the desirability of such a device, and has made it one of the requirements specified in the rules issued some time since for the guidance of its inspectors.

The cut-off box which we illustrate below was devised by Mr. Weston for this purpose, and has for some time been in the circuits of the United States Illuminating Company in this city. It consists of a simple switch or circuit-shifter inclosed in a neat box, and so arranged that no person, however ignorant, can fail to understand its manipulation. The external appearance of the box inclosing the switch is shown in Figs. 1 and 2, and Figs. 3 and 4 show the internal arrangement. The box is attached to the wall of the building at or near the point where the main wires of the circuit enter it. The terminals of the main wire are carried into the lower part of the box and attached to binding posts shown at *w w* in Fig. 3. These binding posts are connected by means of flexible conductors with the springs *B C*, which are mounted upon a common rock-shaft *A*, but insulated from each other. The terminals of the loop conductor, which includes the different lamps within the building, are connected to similar binding posts at the top of the box, shown at *t t* in Fig. 3. These binding posts are in electrical connection with contact plates *H H*, which are in the path of movement of

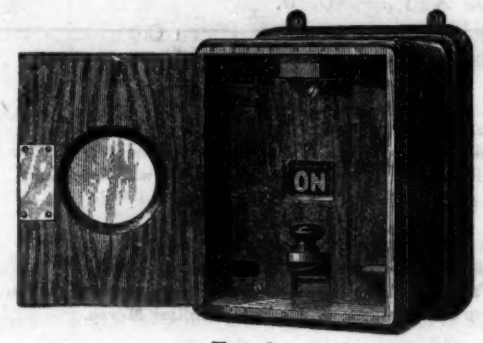

FIG. 2.

the contact springs *B C*. Similar contact plates *K K*, also in the path of movement of the springs, are joined together by a cross-connecting piece, so that when the springs rest upon *H H* the local circuit is introduced as a loop in the main circuit, but when the springs are in contact with the plates *K K* the local circuit is cut cut and the main circuit completed through the cross connection. As the currents used are very large and the electromotive force very high, ordinary forms of circuit-shifters or switches would be apt to produce an arc, or a very injurious spark, at the moment of shifting the circuit. This is obviated in this device by so arranging the contact-plates and springs that the springs move very suddenly and make contact with one set of plates before breaking with the other. The spring *S* tends to turn the rock-shaft so as to bring the springs into contact with the plates *K K*, but the rock-shaft when turned back against the tension of the spring is held in position by a detent *C* engaging with a projection on the lever *E*, as shown in Fig. 4. By pressing the key on the end of the lever *E* the rock-shaft is released and the spring immediately shifts the contact springs over to the other set of plates.

The key *L*, shown in the lower right-hand corner in Fig. 2, serves to turn the shaft back into the position shown in Fig. 4. All of the working parts of the switch and all parts in electrical communication with the circuit are inclosed behind a partition *p*, so that it is impossible for any one manipulating the switch to be brought accidentally into contact with any part of the circuit. This is a very

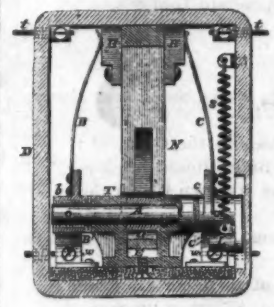

FIG. 3.

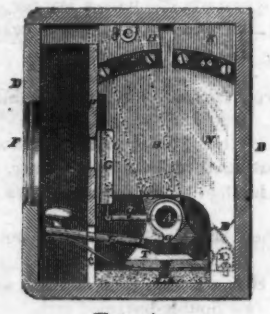

FIG. 4.

desirable feature of the device, as with currents of such high electromotive force as are now used in some arc systems a very unpleasant or even dangerous shock might be received from coming into contact with any exposed part of the switch or the circuit wires.

An indicator *G*, attached to the rock-shaft, moves up and down in front of an opening in the partition, and shows whether the circuit in the building is on or off. All necessary manipulations of the switch are effected by means of the two keys appearing in front of the partition, and these are inclosed by a door which can be locked so as to prevent any unauthorized or mischievous meddling with the switch.

IT MIGHT HAVE BEEN WORSE.—A South End woman received a telegram, and her face blanched and her hand trembled as she held the unopened envelope before her. Giving it to her daughter, she said: "Read it." The girl obeyed. "Papa has broken his leg and gone to the hospital," she said. The mother's face brightened. "Thank Heaven, it is no worse. I feared he might be going to bring somebody to dinner!"—*Boston Post.*

The Telegraph in the Law Courts.

The two suits brought by Mr. William S. Williams against the Western Union Company to enjoin the consummation of the notorious consolidation agreement and also to restrain the issue of the $15,000,000 of watered Western Union stock to the stockholders of that corporation, were upon the calendar of the Superior Court, this city, for Feb. 5. Counsel for the plaintiff moved for an early trial. Counsel for the defense requested that the case go over for the term, pending the appeal which had been taken by the Western Union Company from the decision of the General Term. They also stated that two of the directors of the defendant company had died and their successors had not been made parties defendant to the suit. Mr. Sewell, for the plaintiff, replied that the appeal of the Western Union Company had been taken in bad faith and would be of no avail. Judge Freedman directed that the case remain on the calendar until the 14th inst. In the mean time he would decide the question before him.

In the suit brought by the Mutual Union Telegraph Company against the Western Union Company, in Chicago, to compel the Western Union Company to receive dispatches collected by the Mutual Union Company from its patrons, directed to points which its lines do not reach, but which are reached by the Western Union, a decision was rendered by Judge Moran, of the Circuit Court, on Jan. 2. The judge, after reviewing the allegations of the bill, said that the main question seemed to be whether or not the Western Union Telegraph Company was compelled to receive from the hands of the Mutual Union or its agents telegraphic dispatches dated at Chicago, directed to points on the Western Union lines and which were not reached by the Mutual lines. The Western Union and other telegraph companies exercised a quasi-public employment, and there were certain public duties and relations which they were bound to discharge, because the law of the State clothed them with certain public rights, such as that of eminent domain. They were protected by certain penal statutes from being used as instruments of fraud by having bogus dispatches sent over their lines. At common law they were bound to receive from all persons who offered them dispatches and tendered them the ordinary rates and perhaps submitted to their ordinary rules with reference to writing on their blanks, and to transmit all such messages in the order which they were received without fear or partiality. Section six, of the act for telegraph companies provided that if any person or company owning or operating any line in the State refused to receive any dispatch from any other company owning or operating a telegraph line in the State, or should refuse or wilfully neglect to transmit the same in good faith and without partiality, it should forfeit all rights and franchises, etc. It seemed that the Mutual Union either came to the Western Union as a patron or as agents of a patron, with full authority to do whatever was necessary or in consonance with the reasonable rules of the Western Union Company. Whichever was the theory—whether the Mutual Union was patron or agent or agent of the person whose name was signed—the company asked to transmit the dispatch was not authorized in refusing it. The injunction must be granted, but it must not be understood as affecting night dispatches. They stand on a different foundation and are made the subject of special direction. It was possible that the company could not be compelled to receive night dispatches. Such dispatches were received on the understanding that they were to be sent during the night, but not in the order in which they were received. The decision in regard to that point would be reserved until the order was entered.

In the same city the Western Union has filed a bill in the United States Court praying for an injunction to restrain the recently licensed company of the same name, of Illinois, from doing business under that title.

At Albany, in this State, the Comptroller has requested the Attorney General to bring an action against the Mutual Union Telegraph Company for failing to make a proper return of their stock for the purposes of the corporation tax law.

A communication was read in the Senate at Albany on Feb. 1 from the Attorney General and Comptroller in reference to the suit on behalf of the State against the Western Union Telegraph Company. It states that under the law of 1880, as amended in 1881, the Comptroller is authorized to collect from corporations doing business within this State a certain percentage upon each one per cent. of dividends it would pay upon its capital stock. This tax was due in November. The Western Union Telegraph Company at that time had not, it is alleged, paid its taxes, and according to the dividend that it is said to have paid it would owe to the State about $125,000 for taxes and would be liable to pay $10,000 as a penalty for not paying when due. The Comptroller reported to the Attorney General that the Western Union Telegraph Company had not paid its taxes, and requested the Attorney General to sue at once to enforce their payment. A suit was brought to recover $130,000 back taxes and penalty. Papers were served upon the officers of the company. About the same time an application was made to the Supreme Court by John Moore to dissolve the Western Union Company, alleging an illegal increase of capital stock to $80,000,000. If the suit to recover $130,000 for taxes, etc., is allowed to be prosecuted, and that amount is recovered, it is questionable whether that will not be an adjudication that their capital of $80,000,000 is valid, and thus prevent the action of Mr. Moore. The Attorney General and Comptroller desire instruction by concurrent resolution or other method from the Legislature whether or not they shall enter up judgment in the case.

Counsel for the Western Union Company say that the failure of the company to answer the summons and appeal was a simple oversight. There was no intention of raising the question of the ratification of the whole issue of stock by suffering the State to collect taxes upon it. The company is advised by its counsel that a good defense to the suit exists.

The bill in equity in the case of the Commonwealth of Pennsylvania against the Western Union Telegraph Company, a hearing of which was refused recently by the Supreme Court, has been filed by the Attorney General of the State in the Court of Common Pleas and served on the manager of the company in Harrisburg. The bill makes eighteen complaints, and requires the defendant company to appear within fourteen days or judgment will be confessed.

A St. Louis special to the Chicago *Tribune* says:

"The Western Union Telegraph Company of New York has been arguing at Belleville for a new trial in the Board of Trade condemnation case. Papers disappear and affidavits filed cannot be found until the day of trial. The tent near Brooklyn is still peopled with roughs and negroes from East St. Louis and Brooklyn. It is a nuisance and a dangerous locality for citizens living in the vicinity. Telegraph poles and wire, property of the Board of Trade Company, are uprooted, broken and secreted. It is estimated that $75,000 have been expended by the New York company for secret service in Illinois during the last few months."

The Western Union Telegraph Company, Jr.

The precise motive of Messrs. Colvin, Hayden and Hurlburt, of Chicago, in making application to the Secretary of State of Illinois for license to organize a new company, to be know as the Western Union Telegraph Company of Illinois, has not yet become apparent. According to the promoters of the scheme the purpose of the organization is a *bona fide* one—to build a system of telegraph in Illinois and elsewhere which will be independent of all other systems whatever.

"The field for building new telegraph lines," says one of the attorneys of the new enterprise, "is not nearly occupied, as those interested in telegraphy consider, and the prospect of business for the new company is a good one. The new line will use the latest methods and most improved systems of telegraphy extant, some of which are entirely new and not in use by any other telegraph company. There seems but little doubt that the enterprise will receive support. A wealthy gentleman has offered to take a tenth of the stock of $1,000,000."

In reply to the question why the name of the Western Union Telegraph Company of Illinois had been adopted for the new concern, the same gentleman replied: "There has been in contemplation for some time by men of wealth in this city the organization of a new telegraph company with a larger capital than this or than the Board of Trade Company. Another name was agreed upon, when it was discovered that the Western Union Company was not incorporated. Then the incorporators of the new company concluded that as there was no good reason why they should not take that name, and as it might give them good vantage ground if the Western Union of New York should attempt the same disreputable tactics it has resorted to in delaying and hampering the construction of the lines of the Board of Trade Company to East St. Louis, to accept this name."

"It has been surmised," was suggested, "that the new company proposes to take legal measures to prevent the old company from operating under its name in Illinois."

"Of course," was the reply, "it is supposed that the new company will not be imposed upon by any foreign corporation and will defend whatever rights it obtains by its franchise for Illinois. I suppose the name of a corporation is as much of a franchise as any other right conferred by the charter."

On Jan. 30 Mr. H. D. Colvin, one of those most prominently connected with the new organization, and who is agent in Chicago for the United States Express Company, received a telegram from the president of that company announcing that the interests of the company demanded his withdrawal from the new scheme. He thereupon withdrew from the latter. Chicago papers profess to see in this move the fine hand of Mr. Jay Gould.

The new company, it is authoritatively stated, has no connection with the Board of Trade Telegraph Company. It is reported by those authorized to speak for the Western Union of Illinois, that they are daily receiving requests from capitalists to join the company, and that the books will be open probably the latter end of this week.

A Springfield (Ill.) journal observes that in any event the result of the action in question must prove of advantage to the people of Illinois. The Western Union Telegraph Company, it asserts, has on various occasions declined to pay taxes levied by the State of Illinois, on the ground that it was not incorporated in that State. It will now have to be incorporated, the Springfield paper thinks, and it argues that this will help to fill the State treasury.

The Telephone in New England.

On January 31 a special meeting was held in Lowell, Mass., of the directors of the several telephone companies whose headquarters are in Lowell. The meeting was called to hear and take action upon the report of Mr. A. A. Coburn, who for six weeks past has been employed to audit the accounts of the several companies, from the beginning of the Lowell telephone business, under direction of a special committee from the directors, of which Mr. John F. Kimball is chairman. The reports of the National Bell Telephone Company of the State of Maine, and those of the Bay State, Suburban, and Union Telephone companies were accepted and ordered recorded and filed. The meeting then adjourned.

After adjournment an informal discussion of telephone matters was had. Speaking of the expenditure of money that had been made during the past year, Mr. Ingham said when they started the suburban business they had in round figures $102,000 in the treasury. With this they had paid $20,000 debts of the old company, had expended $40,000 in construction, and had to-day a balance of $40,000. They had increased the net earnings since August by $21,000, making fully a fifty per cent. investment on money expended. These were unusual figures, and exceeded any other operations of the management. The Boston & Northern Company had spent over $100,000 for the purchase of exchanges, some of which were at the time of purchase earning much less than the company's average; yet the company, since it had come under the present management, had increased its net earnings $27,000, and showed on the money expended almost a thirty per cent. investment. Maine shows an increase in net earnings during the year of $30,000, or a thirty-four per cent. investment on money expended.

Concerning the lasting qualities of wires, General Manager Downs stated that the companies had wires in perfect working condition to-day that had been strung for fifteen years, being in such cases old telegraph lines that had been acquired by purchase. Mr. Ingham stated that it was claimed by some, and was quite commonly used in argument against telephone investing, that take away their business and they had no property to show for capital invested. He claimed that to-day the Lowell Telephone companies had in value $75,000 more in property than was indicated by the combined capital of the companies. No one could come to New England to-day and duplicate this system for less than $75,000 more than the figures representing the combined capital. As an illustration of the way by which the property increased in value without expenditure of money, it was explained that many of the lines that ran from cities to suburban points were paid for wholly by the parties benefited. Admitting it were possible for a new system to come among us, would the new comers meet the same aid, lines being already in use? The town of Uxbridge was another example—that town having offered $1,200 if lines were carried to that point. It must from such facts and indications be evident that the present plant could not be duplicated at the same cost. The business all about them was increasing at a tremendous rate, notwithstanding that January had been a very unfavorable month in more ways than one. Suburban would show an increase of over 100, making the total subscribers over 1,000.

The matter of listing the stocks upon the Boston market was then discussed. It was the opinion of all that the time had come to take such action, and it was also the universal opinion that the stocks first so to be placed should be the Bay State and the Boston & Northern.

The auditor's statement shows the assets of the various companies to be as follows:

National Bell Telephone Company of the State of Maine, $672,210.65; Boston & Northern Telephone Company, $841,467.17; Bay State Telephone Company, $833,414.92; Suburban Telephone Company, $400,477.27; Union Telegraph & Telephone Company, $108,527.18.

The gross revenue and expenses of the several companies were as follows: National Bell Telephone Company of the State of Maine, gross revenue, $38,444.46; expenses, $20,117.66. Boston & Northern Telephone Company, gross revenue, $32,483,89; expenses, $17,782.58. Bay State Telephone Company, gross revenue, $33,414.92; expenses, $17,018.37. Suburban Telephone Company, gross revenue, $19,047.10; expenses, $8,015.39. Union Telegraph & Telephone Company, gross revenue, $4,827.04; expenses, $1,437.05.

Rumored Consolidation of the Western Union and Mutual Union.

For some time there have been reports that the troubles between the Western Union and Mutual Union telegraph companies were approaching an adjustment. The statement, said to have emanated from Mr. Jay Gould, was made that the Western Union had offered to lease the Mutual Union lines for a term of 100 years and pay 6 per cent. interest on the $5,000,000 of bonds and 1½ per cent. on its $10,000,000 of stock. Beyond Mr. Gould's rumored proposition it could not be ascertained that any basis for a settlement had been formally suggested. Mr. John G. Moore, the president of the Mutual Union, said there had been negotiations to end the litigation, but no official action had been taken.

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CONTENTS.

PAGE.
ILLUSTRATED ARTICLES:
Electric Lighting—XV ... 81
The Weston Cut-off Box ... 82
POETRY:
Johnny Bull to Jonathan ... 81
EDITORIAL:
Mr. Edison on Electric Lighting ... 84
MISCELLANEOUS:
The Telegraph in the Law Courts ... 83
The Western Union Telegraph Company, Jr ... 83
The Telephone in New England ... 83
Rumored Consolidation of the Western Union and Mutual Union ... 83
An Interview with Mr. Edison ... 85
New Lamps and Dynamos ... 85
Underground Wires in Chicago ... 85
Canadian Notes ... 86
The Signal Service ... 86
A Disastrous Storm ... 86
Progress of the Edison Companies ... 86
Another Reduction of Rates ... 86
District Telegraph Notes ... 86
COMMUNICATIONS:
Sanitary and other Matters in the Chicago Telegraph Office ... 86
Chicago Chat ... 87
Telegraphy in the Northwest ... 87
The Boston Telegraph Operators' Ball ... 87
Annual Reception of the Hornellsville Telegraphists ... 87
DEPARTMENTS:
The Electric Light ... 87
Telephone Department ... 87
Dashes Here and There ... 88
New York City Items ... 88
Personal ... 88
Births ... 88
Marriages ... 88
Electrical Patents Issued ... 88
Business Notices ... 88

NEW ADVERTISEMENTS.

PAGE.
HAINES BROS.—Promoters and Brokers ... 89
CURT W. MEYER.—Electrical Scientific Toys ... 89
PATTEN PUBLISHING COMPANY.—Songs and Ballads ... 89
UNITED STATES MUTUAL ACCIDENT ASSOCIATION.—Insurance ... 89
C. E. L. BRINKERHOFF.—Boston & Sandwich Glass Co ... 90
E. G. RIDEOUT & CO.—Premium List, *Golden Argosy* ... 90
SMITH & HARDY.—Stencils ... 95
R. B. CLARKE.—Shorthand by Mail ... 96
W. B. HALE.—Electrical Patent Solicitor ... 96
R. S. V. RANDOLPH.—Agents Wanted, "Spy of the Rebellion" ... 96
BRENT.—Situation Wanted ... 96
RE-ARRANGED ADVERTISEMENTS.
WILSONIA MAGNETIC CLOTHING CO.—Magnetic Clothing ... 89
ELECTRICAL SUPPLY CO.—Learner's Outfit and Prosch Key ... 96

MR. EDISON ON ELECTRIC LIGHTING.

Elsewhere in to-day's paper will be found an account of an interview between the reporter of a Boston paper and Mr. Thomas A. Edison, in which the whole question of electric lighting is analyzed and summed up in a characteristic manner. Mr. Edison is one of the great central figures which occupy the public mind the world over in connection with this subject. We have heard more of him and from him on the question, perhaps, than from any other source, and naturally his remarks, when they strike the public ear, are sure to evoke interest and comment.

For many months past, the public, both here and in Europe, has been anxious to know what success Mr. Edison has had with his system, and in the absence of authentic and direct information, the press has been filled with numerous conjectures, pro and con, as to the results attained. His declarations to the Boston reporter are therefore timely and welcome, however open to criticism the manner in which the information is conveyed may be. The article recalls another one, published about four years ago in the same journal, and which, by means of elaborate descriptions and illustrations, sought to tell the public confidently that which it is aimed to tell us now—that Mr. Edison had solved the problem of electric lighting; only this time we are to understand that he alone has actually done it.

Mr. Edison begins by telling in pointed language what real electric lighting is, according to his conception, and after describing his system with some minuteness of detail regarding the central station at Pearl street, in this city, he proceeds to tell what is *not* electric lighting, and makes this the excuse for a sally against the arc method of electric lighting, attacking it at its weakest point—the dangers from faulty and insufficient insulation.

We believe, with Mr. Edison, that the installation of arc lights and the disposition of the conductors is open to objections, more or less serious; we believe even that the authorities have been rather indifferent in considering the question of safety, and in prescribing the conditions necessary to obviate danger, or at least to eliminate the chances of it to the highest degree; but we are not quite prepared to accept his contemptuous stigmatization of arc lighting as "boys' play" or the "temporary makeshift," which, no doubt, he intends to make his system supersede. There is one ground on which Mr. Edison's assertions cannot assail the arc light—that of economy. The economy of the arc light has been so often demonstrated that we now look upon it as well and strongly established. Even if the elements of lurking danger could not be removed from its applications, it would still hold its own ground. The railroad locomotive is a perpetual element of danger in the community, yet its success is ever becoming greater. It is no more impossible or improbable that we shall realize improvements tending to greater safety in the case of the one than we have done in the case of the other. On the other hand, the question of economy is particularly Mr. Edison's weak point. He may assert that, "as it is, he does not find that it is even necessary to come down to the exact level of gas, as people are willing to pay more for the light than for gas light;" but we are inclined to think that though some people might desire the light, even though it cost twice as much as gas, a greater proportion would content themselves with the gas light, even though the Edison light should offer some advantages. Moreover, the question may be asked, which, no doubt, is uppermost in all minds: Can Mr. Edison make it pay at lower figures than the present, or at lower figures than gas? Until Mr. Edison has satisfactorily proven that point, he must be regarded as living in a glass house, with reference to the arc light. If, as he asserts, a unit of electric light has a commercial value 33 per cent. above that of gas, then certainly we must consider the economy of the arc light to be still more clearly shown. It really makes no difference by which method the light be measured; the margin of efficiency is so much greater in the case of the arc light that the question may be waived without debate. It is to be noted as an interesting fact, however, that of late Mr. Edison has been devoting considerable attention to the arc light in the endeavor to apply to it his low-tension currents. This, to say the least, is a tacit acknowledgment of the merits of this light, for Mr. Edison is ordinarily too busy to waste time on mere "boy's play." Moreover, his attacks on the deadly high-tension currents used for arc lights lose weight in view of the fact that he has lately himself constructed machines whose electromotive force, we believe, is as high as 300 volts, or nearly three times as high as his standard of 110.

Mr. Edison vents his wrath against his competitors in the field of electric lighting by firing a strong shot at the storage battery, which, in his opinion, is a mere "catch-penny sensation, a mechanism for swindling by stock companies." We shall not pretend to champion the storage battery, for, as yet, very little is known of its possibilities, and it would be premature to pronounce on its merits. We cannot consistently say as much in its favor as we can of the arc light, which pertains to the domain of established facts. Still, we know that in competent hands it has actually produced valuable and economic results, as the installation at the Théâtre des Variétés, in Paris, amply proves. In our article on this installation, which appeared some weeks ago, it was proven conclusively that the use of storage batteries in that instance gave a substantial economy, the figures being accurate and compatible with the facts of the case. The storage battery allows the use of much smaller dynamos and engines, to attain the same result, than would be required in using the current directly, for the time available for charging is usually very much longer than the time during which the light is to be used. Another important consideration is that with storage batteries the current can be transmitted to a distance with a smaller loss in the conductor, because currents of higher electromotive force can be used. In this way the loss of economy of the storage battery is made up in great measure; and in many instances the greater convenience and adaptability of the system of lighting by storage batteries turn the scale in its favor. Mr. Edison would, no doubt, acknowledge that the economy of his system would not be so great on a smaller scale, and in that fact we see an opportunity for the storage battery to thrive and grow. No doubt we could go back to a time when the Edison system did not represent any more efficiency than does the storage battery at present: but he has improved it until it has reached the present state of efficiency; and it may be confidently asserted that the storage battery will meet with as much attention. It is only of late that any practical attention has been given to the storage battery. It is quite new and has not yet received a fair trial. There are many instances where its use, even though not economical, would be desirable. In this age of improvement, it will not be long before we begin to make the storage battery more efficient, cheaper and of economical value. Many minds are at work in the field, even at this early period of the history of storage batteries, among them the indefatigable and prolific Edison himself, which is the best proof, or at least as good as any, that the question is worthy of study, and that it promises more valuable results in the future.

On the whole, we do not find that Mr. Edison has brought any new facts to light on which to base his prejudice against rival systems. His assertions contain nothing that need shake our confidence in a continuance of the success which electric lighting has had so far. We believe that the electric light has come to stay in all its phases. There may be some cases where circumstances will lead to a preference for the arc light, while in others the incandescent light will rule. The field and scope of electric lighting are large enough to make room for all, Mr. Edison's system as well as the rest, even though its absolute economy were to remain forever, as now, in doubt. That Mr. Edison has done marvels in developing the electric light every one is ready to acknowledge, as we did at the beginning; and he ought to be prepared to do the same justice to his colleagues in the science.

As a rule, the teaching of telegraphic students is not to be commended, in view of the fact that there are already more telegraph operators than there is remunerative employment for; but no reasonable person could object to the efforts in this line of a Reading (Pa.) telegraph operator, as related in the Philadelphia *Times*, especially in the light of his subsequent action. This young man was, like many of the craft, extremely bashful. He had courted a young lady in a mild sort of way for a long time, but never had been able to make known his intentions in an intelligible manner. During his leisure moments he taught the young lady telegraphy, and recently gained her consent to stretch a telegraph wire between her home and his boarding house. The first message that came to the young lady was a proposal of marriage. Although the answer was all that any reasonable person could expect, yet the young man was so diffident that he did not venture near the house for four days. Electric communication finally became too slow, however, and the young man went to the house in person. The wire and telegraph instruments are now for sale. If real genius is to be rewarded this young man ought to be happy.

WE can see little room for congratulating telegraphists upon the adoption of a 15-cent rate between this city and Washington, and the probable inauguration of a war of rates. A cut-throat competition has always been a losing one, and hitherto the working operators have subsequently been called upon to make good the deficiency, by an enforced contribution from their meagre salaries. It stands to reason that a lean treasury cannot produce a fat income, and if a 15-cent rate for distances of 250 miles does not result in the leanest kind of a treasury we shall be much mistaken. We believe that the general public would rather pay a quarter of a dollar where speed, reliability and neatness were assured, than 15 cents for a message that arrives two hours too late, and looking as though it had come through a mangle or had been run over by an ice-wagon. The various companies can all find room for improvement in such matters; and the one which would maintain, not the *lowest* rate, but the *lowest paying* rate and give the public's business rapid transmission and thorough reliability would be duly recognized and supported.

THAT idea of new opposition companies pirating the Western Union's name, as was done recently in Illinois, seems to be very favorably received, and we now hear that another rival concern, with a capital of $1,000,000, has been incorporated in Kansas under the name of the "Western Union Telegraph." We would rather see opposition lines sail under their own colors and name; for while the idea is very funny, viewed as a piece of retribution on the old concern, it is only a grade better than "competing" by means of axes and saws. It is something akin to pirating a man's trade-mark, and may prove to be a greater fraud on the public than the old original Western Union.

WE learn that the Franklin Institute of Philadelphia contemplates holding an exhibition this year, which will be exclusively devoted to electricity, magnetism and their related sciences. We hope the project will not fall through for want of proper encouragement from manufacturers, inventors and the press. Philadelphia has, through the Centennial Exposition, demonstrated her ability to conduct enterprises of this kind, and the Franklin Institute is noted for its earnest and unflagging endeavors to promote the welfare of American industries. We wish the Philadelphia Electrical Exposition every success.

AFTER the Newhall House fire at Milwaukee recently, a great deal of talk was made about the alleged fact that the telegraph wires impeded the operations of the firemen; yet, when, during the fire at the Moffat Building, Broadway, this city, on the 31st ult., the clerks swung themselves from the windows by means of the telegraph wires and so escaped, no particular mention is made of that fact. The wires may at times impede the working of firemen, but they are just as likely, as in this instance, to prove the means of saving many lives.

IN view of the opposition lines pirating the name of the Western Union, wherever the latter has not obtained a State charter, it would appear to most people that there's a good deal in a name—Western Union, for instance. If this be so, it would be well for the Bankers' & Merchants' Telegraph Company, since it has concluded to ask for popular support, to adopt a new name. "Bankers & Merchants" will scarcely suit Herr Johann Most, Justus Schwab, and the anti-monopolists.

THE confession of nine scamps in this city that they have been tampering with the fire-alarm telegraph boxes and sending false alarms, from no other motive than pure maliciousness, is a strong point in favor of the doctrine of innate depravity. Thus far no device has been found to effectually prevent this form of crime, though experiments are now in progress in this and other cities with that end in view. The subject is one worthy the attention of inventors.

THE Canadians now promise three new Atlantic cables before the end of this year—one by an extreme northern

route, through Scotland and Greenland to Fort Churchill on the Hudson Bay, and thence southward through Hudson Strait and Bay; the second more southerly, to be landed on the Straits of Belle Isle, and the third reaching Sable Island, and running thence to the Nova Scotia coast. These are rosy promises, but we hope to see at least one Canadian cable in free competition before long.

THE underground system of conducting telegraph wires must soon be tested in Chicago, since the time fixed by the Council of that city for the removal of the overhead wires will arrive on the first of May next, and the various officials have recently declared that the law will be enforced to the letter. We believe that the change, though a costly one, will ultimately be of great advantage to the companies concerned.

IT is now promised that the Postal Telegraph Company will have its line in operation to Chicago some time in April. President Beard says they are pushing the work vigorously, and that their lines will enter Chicago underground.

An Interview with Mr. Edison.

The Boston *Herald* sent a reporter, a few days ago, to see Mr. Edison, for the purpose of obtaining information in regard to the progress of his system of district lighting, and to get his views on storage batteries, electric railways, etc. Mr. Edison talked very freely. The report of the interview occupies four columns of the *Herald*, most of it consisting of a denunciation of arc lights and storage batteries, which must be taken with a grain of allowance, in view of the fact that these are the principal features of a rival company.

Referring to the work in the New York district, Mr. Edison said: "What I started to do was to light a whole city, furnish electric light as gas is furnished, and collect and make money on bills running as low as 75 cents a month. In the district we are now lighting we have several consumers whose bills do not amount to more than $1.50 a month. Our plant at 237 Pearl street is one of the typical stations by which we propose to light cities. Such stations can be multiplied indefinitely, so that we can engage to light the largest as well as the smallest cities in the world. At the present time 289 stores are taking light regularly from us on meter. We have commenced to connect more stores with our mains, and expect to have, by the middle of February, 550 stores lighted from that station. In most of the stores now lighted by us gas has been entirely cut off. Many, indeed, have not been using gas for the past four months. In fact, they depend entirely upon us for their light, and we do not fail them. At first we placed temporary fixtures on their gas chandeliers, but are now gradually changing them over to our electric chandeliers. This looks like permanency, does it not? Well, that is just what it is. We have come to stay. We have 19 miles of street mains and four miles of service pipes, and all our wires are underground. Persons outside who do not understand our system are trying, I know, to make people believe that if we are running, and all the lamps in the circuit are put out, there is at once a loss—a waste of energy. According to our system, if all the lamps in the circuit were put out, the automatic cut-off of the engines causes less steam to be admitted to the cylinder, but sufficient to keep it running. Suppose, for example, a single engine was running and its dynamo connected to the mains and no lamps were being used. The only power required would be to keep the engine running without doing work. If, now, eight lamps are turned on by some consumer, the automatic cut-off of the engine will admit more steam to the cylinder and the engine will give one horse-power in work; if 80 lamps are now connected, more steam is admitted to the cylinder, and the engine gives 10 horse-power; and so on up to the capacity of the engine. The steam dynamos at our station, when working economically, give 185 horse-power. We have six of them. Up to 1,400 lights we use a single steam dynamo. When the consumption exceeds this number of lights we add another dynamo and engine. When the consumption reaches 2,800 lights, another is added, and so on—thus each steam engine and dynamo is worked at its most economical point; the number of engines working depends upon the consumption; our greatest consumption is between 5 and 6 P. M., when five engines can be put on, leaving one to spare, which can instantly be connected to the mains in case of accident to any of the others; but even if the spare engine should become disabled, four steam dynamos will carry the load, but not with the same economy as if five were used. Before 5 and after 6 P. M., the consumption is greatly lessened, and there are two or three spare steam dynamos. What I mean by a steam dynamo is where the engine is connected direct to the dynamo without the intervention of pulleys or belts. We started our engines on Sept. 4, last, and since that time the current has never been off the main for a second, night or day."

The arc light, Mr. Edison says, is not good for any kind of illumination. "If it was, it appears to me the Almighty would give us eyes different from those he has bestowed upon us. The arc light is unreliable, to begin with. Its very nature makes it so. It has no diffusive power. Aqueous vapor, as is well known, will absorb the blue, green and violet rays which make up a white light. It is only the red and yellow rays that will pass through it with facility; of these rays the arc light possesses very little. In a dense fog you cannot, therefore, but just see an arc light, but a gas lamp alongside it can be discerned easily on account of the great volume of red and yellow rays. I wonder your people in Boston have so many arc lights. If their use is continued a few years longer the people's eyes must suffer. In Paris, in the Jablochkoff works, all the workmen are troubled with sore eyes. It produces a new kind of disease of the eye, the name of which I cannot now recall. Under the influence of such a light, if you watch the contraction and expansion of the eye from the alternate brilliancy or quick alternation to a low power of illumination, you will see what I mean."

As to the success of his system, he says: "I started in 1878, to subdivide the electric light and displace gas. The first is accomplished; as to the latter, a great deal of talking has been done, but nevertheless we are going to do it. It is gradually being done by distributing it in exactly the same way that gas is distributed—that is, from large central stations, with main pipes running through the streets, tapped wherever required, and run into the cellars of houses, the electricity measured to consumers with meters, and that is the only way it will ever be done. You cannot place in the hands of the public any mechanism of a complicated character and have it prove a success. It must be under the control of those who understand the business; the public have got to pay their bills, and that is all we ask of them. We now know exactly what incandescent lighting costs at the present time. The cost of production and investment required for a given output is being diminished continually. If we start a station in Boston we shall sell light at the same price as we do in New York, which is about the price of gas. In 1878 people said the subdivision of the electric light was impracticable—could not be done. Now we are doing it upon a commercial scale, and are not losing money. If this has been accomplished in four years, why cannot still further improvements be made to the end of materially reducing the cost of production? Of course they can, and if, by such improvements, we can produce the electric light at less cost than at present, the public will get one-half the benefit ('if our stockholders feel like it') and we the other half. As it is we do not find that it is even necessary to come down to the exact level of gas, as people are willing to pay more for our light than gaslight. I consider from experience gained thus far that a unit of light by electricity has a commercial value 33 per cent. above that of gas, as gas has above kerosene, and if we desired we could get 33 per cent. more for the same unit of light over and above gas, as people are willing to pay more for the same amount, but of a better quality. They will pay $2.25 for gas for the same amount of light they can get in kerosene for 60 cents. Men will sometimes get excited over their gas bills, put out the gas and use kerosene; but they will inevitably return to gas. We have had an experience of that kind. One of our customers thought he was paying too much for his light, and we cut him off; but in two or three days he came to us and wanted it put back.

"Some people are continually chattering about the cost of electric lighting, that it cannot be made as cheap as gas, etc. If in answer to these people I show that it is possible, and that it is an exceedingly profitable business when done on a large scale, the public would be dissatisfied to pay the price we sell it for. On the other hand, if I say we can just compete with gas, and have to sell it for about the same, then the investing public will put no money into it. So, you see, I am in a dilemma about making statements as to cost."

Of his electric railroad Mr. Edison says: "It is doing well. I have it running from a point on the Pennsylvania Railroad to Metuchen, a distance of 2½ miles. The locomotive runs at the rate of 29 miles an hour with one passenger car containing 40 passengers. It is 3 feet 6 inches gauge, with a 16-pound rail. The weight of the locomotive is three tons. It has sufficient traction for light trains, and runs often. I put it up as an experiment. I have also a freight train which carries 30 tons of freight and makes 8 miles an hour. I have only 8-horse power on the locomotive. I am now, however, building a large one of 45-horse power, with which I expect to be able to pull about 18 coal cars. The track of my road has been down several months, and still holds its insulation. I made a run the other day at the rate of 12 miles an hour in the snow, and there was only a leakage of 2½-horse power on the whole line of the road."

When asked if power could be produced in this way to run a locomotive at as small cost as for coal used in ordinary locomotives, he replied, "Yes. The reason is that in the boilers of our locomotives their heating and grate surface is small. A locomotive is in this way very uneconomical. You have got to force it at a great waste of energy, while a stationary boiler and engine at a station can utilize more power from coal, and, by using a cheaper coal, can produce power at a great economy, and, although to turn this power into electricity and get it on the track there is another loss, it never reaches that due to the want of economy in the locomotive."

The substance of Mr. Edison's criticism on the storage battery is that it involves a loss of power, and that in every case it is cheaper to derive the current directly from the dynamo,

New Lamps and Dynamos.

The Hartford Engineering Company, of Hartford, Conn., is very busy at present in the construction of electric lighting apparatus for a new electric light company that is about to bring out a new dynamo-electric machine, the invention of Mr. D. A. Schuyler, of New York. We are not permitted as yet to disclose further details concerning this machine, but we hope to be enabled to do so in a short time. On February 2d, a number of gentlemen interested in electric lighting were present to examine the apparatus and to witness its working. Among those present were Messrs. Norman McCarty and C. O. Mailloux, of New York, who exhibited some new and improved arc lamps. The lamps shown by Mr. McCarty were of an entirely new design, and are specially adapted to indoor use. One modification is in the form of a bracket or side lamp, which is so neat and artistic in its design that it would add to the appearance of the most elegant parlor. We hope soon to give a complete illustrated description of this lamp.

Mr. Alex. Bernstein, electrical inventor, of the Bernstein Electric Light Manufacturing Company, of Boston, and Mr. W. C. Quimby, M.E., of Valparaiso, South America, were also among those present. Mr. Bernstein exhibited some incandescent lamps of a new pattern, which attracted special attention by the improvements which they present. Mr. Bernstein gives to his carbon the form of a thin, hollow tube, about an inch long, and of the size of a goose quill, instead of making it in the form of a filament; this is done in order that the surface presented for the radiation of light during incandescence may be larger, and that the volume of the light-giving centre may be greater. A very important difference in relation to this carbon tube, as compared with the carbon filament in other incandescent lamps, is its low resistance, which varies between two and three ohms, the resistance of a Maxim or Swan lamp being never below thirty ohms, while in some cases it is as high as 100. This low resistance enables Mr. Bernstein to connect his lamps in simple series and in multiple series, an automatic switch being provided at each lamp in case it may fail to work, which substitutes an equivalent resistance. It is well known that the light in incandescent lamps increases in greater proportion than the increase of current. Mr. Bernstein claims that a large volume of current can be maintained in the lamps with more safety to the carbon when the current is of low potential. He makes use of currents of an electromotive force as low as twenty volts, in some cases, and finds that the life of the lamps is lengthened. He can make the intensity of the lamps vary from 15 to 500 candles at pleasure—the light in the latter instance having all the power and brilliant whiteness of the arc light, while being free from the blue rays which are so annoying in that light. These results are very interesting, and we hope soon to be able to give more extensive details of Mr. Bernstein's system of lighting.

Underground Wires in Chicago.

The time fixed by the City Councils of Chicago for the removal of the telegraph wires and poles is May 1, and recent declarations by various officials show that the ordinance will be enforced to the letter. A franchise has been given the Chicago Sectional Underground Company to open the streets and construct and maintain underground conduits for the use of the telegraph and telephone companies, and it has already begun work. On Jan. 30 Mr. E. S. Dreyer, representing the company, closed negotiations with Mr. W. H. Johnstone, president, and Mr. J. Ensign Fuller, manager, of the American Sectional Electric Underground Company, of Philadelphia, for the purchase of the system of laying underground wires owned by that company. The conduit or tunnel which will be used is a cast iron box, four inches square, which will be laid in the streets on the side opposite the water-mains, at the depth of about twenty inches. The boxes will be entirely and permanently buried between the intersecting streets, but at the corner of each street there will be a manhole, four by six feet in size, with openings of eighteen inches at the top. These will be covered with iron, perforated so as to give light to the hole and ventilation to the tunnel, the latter being very necessary. When the conduit is laid it will have in it what is known as a carrying wire, which will be used to take in all of the wires that it may be desired to place in it subsequently. The wires will all be placed in the tunnels by sections of a block each, and will then be joined at the manholes. For the purpose of convenience and better ventilation the conduit will contain four shelves of copper wire cloth, upon which the wires and cables will be laid in order. Each tunnel will hold about fifty electric light wires, and between 400 and 500 telephone and telegraph wires. At intervals of about twenty feet there will be openings through which any wire in the conduit can be tapped for either lighting, telephone, or telegraph purposes.

It is said that the Postal Telegraph Company is anxious to have the conduits completed in time to receive its wires, which are now completed between New York and Toledo, and are rapidly progressing westward. Thus far the Underground Company has not received any overtures from other telegraph, telephone or electric light companies for the use of its system, but has no doubt that if the Council enforces the ordinance regarding the burying of all wires by May 1, the conduits will be in great demand.

Canadian Notes.

Mr. Erastus Wiman, during his recent stay in Montreal, devoted himself specially to the entertainment of General Eckert and a party of friends who accompanied him on the Vanderbilt special from New York. We learn from a Montreal paper that through the General's kindness Mr. Wiman was enabled to transmit, without charge, to every leading paper in the United States, items of interest regarding the Montreal Carnival, and which excited throughout the Union the liveliest interest. In company with Mr. Wiman, General Eckert visited the Montreal Telegraph Company's offices in Montreal, and was very favorably impressed with the appearance of things there.

A Kingston paper, speaking of Mr. C. R. Hosmer, general manager of the Canada Mutual Telegraph Company, observes: "Kingstonians—especially those who have been his intimate friends—cannot fail to appreciate the prominence into which Mr. Hosmer has risen. He was an operator in the Montreal Telegraph Company's office when we knew him first, young but impulsive, quick to perceive an advantage and act upon it. When the Dominion Telegraph Company opened an office here he was made its manager, and succeeded so well that he was soon called to a higher position, that of superintendent of the line in Eastern Ontario. When the two companies effected an amalgamation he was offered a good position, but declined it, and when the Mutual Union was formed he became president of it. He holds this important post still, and he has hopes of seeing it enjoy a large measure of prosperity, notwithstanding the embarrassment thrown in the way by Gould and the bulls and bears operating in connection with him. He is now interested in the new cable company, and it is complimentary to him—an evidence of his tact and shrewdness—that he should be selected by Mr. Senecal as his associate, in floating the scheme in Europe. Mr. Hosmer is ambitious, honorably so, and promises to win greater successes than he has yet accomplished. His rise has been very rapid. He has already become one of the men of the times."

Mr. W. C. Anderson, the lucky telegraph operator, of Lachute, was in Ottawa the other day. After his return from Scotland, whither he goes to procure the bequest left him by an uncle who recently died, Mr. Anderson will reside in Brockville, where he has just purchased the estate known as the Sidney Jones place. The price paid was $39,000.

Mr. Gouix, proprietor of the Russel House, Ottawa, with a view of affording every possible protection to his guests against fire, is having an electrical night watch service put in operation on each flat of his hotel and connected with a tell-tale in the office.

Mr. Angus Grant, district superintendent of the Great Northwestern Telegraph Company, led the great snow-shoe torch-light procession during Carnival week. Mr. Grant is a fine specimen physically of the Scotch Canadian.

The Signal Service.

The Secretary of War has laid before the House a report on the military telegraph lines built under his direction. The total number of miles built is 7,355; number of miles abandoned, 1,685; in operation, 5,670 miles; under construction, 129 miles. The serviceable material from abandoned lines, such as wire, insulators, brackets and all iron poles, is taken down and stored for future use and accounted for as other public property. This is done whenever civil lines are constructed and can perform the military service. Unserviceable wooden poles are left standing. Large quantities of old material have been used in the construction of new lines and it is proposed to utilize the remainder in a similar manner. The report is accompanied by numerous maps, showing routes, etc., from the Chief Signal Officer.

The corps, by the way, seems to get along no better than it has been doing for some time. The subordinates, being terrorized into individual silence, have appeared in ghostly form to torment Gen. Hazen. Some wag has now got up a ridiculous work called "A Handbook of the Signal Corps." It is a little book of ninety-three pages and contains the Constitution of the United States, with all the amendments, the articles of war, extracts from army regulations, salutes, national and international, giving, among other things, the salutes for royal personages, "heirs apparent," etc.—a fine study for snobbish young martinets who insist that telegraphers shall salute them in the public thoroughfares—and, finally, there is a chapter of general instructions, which, oddly enough, contains not a word about the real work of signal sergeants or about the weather.

This book has been distributed among the men and noncommissioned officers of the Signal Service, with the following order in the front of each copy, purporting to be signed by General Hazen:

"The text of this book will be committed to memory by ———, who will be guided by the directions it contains. Inspecting officers will report if the above is observed.

WILLIAM B. HAZEN,
Chief Signal Officer."

"Of course," says the New York *Herald*, "General Hazen never issued such a preposterous order or countenanced so silly an expense of the Signal Bureau's money as the printing of this book. A signal sergeant who should be able to commit this volume to memory would be a phenomenon worthy of Barnum's attention, and after he was ready to recite it—salutes to crowned heads and heirs apparent, ambassadors and ministers and all—to the first inspecting officer who happened along, he would know no more about the signs of the weather than he did before he began the prodigious task of memorizing."

General Hazen, who seems to have a hard time of it all around in contradicting malicious rumors, says that the hand-book contains only what is necessary for observers to know, as in case of war most of them would become at once commissioned officers. He says in conclusion that the criticism of the hand-book is only another of the uncalled-for and unjust attempts of dissatisfied discharged observers, designed to injure him and the office.

A Disastrous Storm.

A great storm of snow, sleet, rain and wind swept over the West and Northwest on the 2d, 3d and 4th insts. Its effect was most disastrous in Wisconsin, Illinois, Indiana and Ohio, where telegraph lines were prostrated in all directions. The trouble increased until at daylight on the 3d inst. Chicago was practically cut off on the arc beginning at St. Louis, on the southwest, and sweeping eastward, including all the country east of the Mississippi River and south of the chain of great lakes. On the 4th our communication with the West was still interrupted. The Western Union Company's communications with Buffalo and with Pittsburgh were all right, but beyond those points nearly all their wires were down. From Buffalo it was reported that the wires looked like clothes-lines, so thickly were they covered with ice. The wires to Canada were all down. At Chicago wires were down in all directions; communication with St. Louis, Cincinnati, Indianapolis and Cleveland was completely shut off. In the oil regions high water was doing great damage. The wires were nearly all down at Franklin, Parker and Oil City. Superintendents with gangs of men were at hand ready to work, but very little could be done until the water subsided. One through wire was kept open to Chicago, and as the Sunday business was light, there was no material delay to messages.

The Mutual Union Company had communication with Chicago for two short intervals only in the afternoon, but their wires were down everywhere. Five wires to Chicago from Pittsburgh and eight from Buffalo were all useless; only one wire was all right between Rochester and Buffalo. Messages were telegraphed to Buffalo, and forwarded from Buffalo to Cleveland by mail and then telegraphed on to Chicago. It is a long time since so severe a storm has affected the telegraphic business of such a wide extent of territory.

On the 6th inst., before half the damage had been repaired, the elements again caused much trouble. Telegraphic communication was interrupted by floods and wash-outs in Ohio, and on the 7th inst. the Western Union office at Marietta, Ohio, was reported completely under water.

Progress of the Edison Companies.

The Edison Electric Light Company has just issued a bulletin, from which we glean the following items:

In the first district of New York City the company is now lighting 310 buildings wired for about 6,225 lamps. The only obstacle ever encountered, namely, the purely mechanical one of the regulation of the engines, it is announced, has now been entirely overcome; the engines are running smoothly, the light is steady, and the customers express satisfaction.

The Edison Company for Isolated Lighting is now making the following installations: California Sugar Refinery, San Francisco, 150 lamps; N. K. Fairbanks & Co.'s lard works, St. Louis, Mo., 178 lamps; Messrs. Metcalf Bros. & Co.'s dry goods store, Detroit, Mich., 175 lamps.

Orders have been received for the following installations: Nonantrim Worsted Company, Newton, Mass., 500 lamps; Messrs. A. C. Yates & Co.'s clothing stores, Philadelphia, 250 lamps; Messrs. Havemeyer & Elder's sugar refinery, Williamsburgh, N. Y., 900 lamps; Oceanic Steamship Company, San Francisco, California, 150 lamps.

It is announced that the Western Edison Light Company of Chicago has closed contracts as follows: Haverly's Theatre, 637 lamps; Daily News Company, Chicago, 176 lamps; R. H. & C. M. Avery, manufacturers of Agricultural Implements, Peoria, Ill., 142 lamps.

The following installations have been made in Cuba: Sugar estate "Esperanza" 70 lamps; sugar estate "Socorro," Sierra Morena, 65 lamps; sugar estate "San Lino" 113 lamps; sugar estate "Constancia" 84 lamps.

The following is the number of Edison plants now in operation in the various countries of Europe: France, 82 installations, 2,680 lamps; Italy, 11 installations, 5,777 lamps; Germany, 28 installations, 3,667 lamps; Holland, 4 installations, 1,648 lamps; Austria, 7 installations, 1,724 lamps; Russia, 14 installations, 2,772 lamps; Belgium, 12 installations, 1,268 lamps.

MR. GOULD'S MILWAUKEE CONTRIBUTION.—The amount of Mr. Jay Gould's contribution for the assistance of the sufferers by the Milwaukee hotel fire was $5,000, instead of $500, as at first erroneously reported.

Another Reduction of Rates.

Following close upon the Western Union reductions between this city and New England and the various points in that section of the country, the opposition lines have made reductions between this city and the South.

On the 1st inst. the Bankers & Merchants' opened up with a rate of 20 cents for a 10-word message between New York and Baltimore and Washington, with 2 cents for each additional word; and 15 cents for a 10-word message between New York and Philadelphia. It was also announced that this company, which has hitherto been considered rather as exclusively a "bankers and merchants'" concern, would henceforth do a general business; though we understand it still holds on to the antediluvian idea of closing up its offices at midnight.

The Western Union, on the 1st inst., met the challenge with a similar reduction.

The Baltimore & Ohio then reduced the tariff between New York and Washington five cents below these reduced rates, giving a uniform charge of 15 cents per 10-word message between New York, Philadelphia, Baltimore and Washington.

The Bankers & Merchants' then reduced its rates to correspond—15 cents between New York, Philadelphia, Baltimore and Washington, but so far the Western Union seems content with the 20-cent rate—five cents more than any one else—and to let the public take its choice.

Mr. Jay Gould, who is believed to carry all the figures in his hat, on being asked about the change, said that it would "not affect Western Union in the least" and that his people considered the reduction as "a confession of weakness that the new company is not securing much business."

A New Electric Light Company in Chicago.

The Sperry Electric Light, Motor and Car Brake Company has been formed in Chicago, with a capital of $1,000,000, to develop the inventions of Mr. Elmer A. Sperry, to some of which we have already referred. Having complied with all legal requirements, the company, it is announced, will at once proceed with the development of its various systems, one of the most important of which is that relating to the electric light. The leading feature of this is said by Mr. Sperry to be that of self-regulation, or the automatic control of the currents. It is claimed the dynamo to be used realizes more current from the power applied than other existing machines, and that the company will, therefore, be able to produce the light more economically than has hitherto been done. Small motors will be used in connection with the lighting system, in driving light machinery, elevators, etc. The application on street cars, Mr. Sperry says, is one of the most promising features of the system.

District Telegraph Notes.

The controlling interest of the Brooklyn District Telegraph Company was purchased on Tuesday, February 6, of Messrs. Delano & Haines, by Mr. H. W. Pope. Three district offices are already in operation, and a large number of orders have been received for boxes. Mr. Pope regards this company as one of his best properties, and will develop it to its fullest extent.

The Manhattan District Telegraph Company of New York is making good progress. It has in operation four districts, and others in process of construction.

The Mutual District Messenger Company of Boston, Mass., has now in operation seven districts, including branches, and is rapidly increasing in business and public favor.

The Denver District Telegraph Company, Denver, Col., predicts from the present outlook a net revenue of 10 per cent. on its capital the first year. An additional district is being opened and the company has many orders on hand.

One of the best evidences of the success of these companies, and the confidence of their promoters, is the indisposition to sell any portion of their holdings.

Sanitary and other Matters in the Chicago Telegraph Office.

To the Editor of The Operator and Electrical World:

SIR: Your correspondent of Jan. 20, who has assigned to himself the three final alphabetic characters as his literary title, is either ignorant of the management of Chicago office as it is, or else he is an outsider who has some personal spite, and takes the hearsay of some discharged employé for gospel truth, thereby taking advantage of your paper by venting his spleen through its columns.

The matter of ventilation has been acknowledged by our management to be faulty, and several schemes have been talked of to better it, and as soon as practicable one will be promulgated. I have been here many years and have always found all the pure air I needed, and never have suffered from cold contracted in the office. Only once in my career here has there been any recklessness displayed in the matter of opening the windows "two or three feet," and that was done by a wholly irresponsible party, who took "a turn," and lowered and raised the windows as high and low as possible, but received only for his freak the jeers and the pity of all. He has been caged, and it will not occur again.

I have made careful inquiry into the St. Paul matter, and find no truth whatever in the statement of your correspondent. The operator referred to was of that class which no office is the better for, and I suppose the management took the man's character into consideration and thought they did not require him longer. There was no error in the case, in either particular.

I was unfortunate once to get into difficulty with Chicago office while working in a distant city. I had what I considered a clear case, and was compelled to refer the matter. In a few days I received a package containing documentary evidence of the most prolix nature and of a character that firmly convinced me that I was a little the poorest operator that had been on that circuit for years. The reason of this was that the Chicago operator was one of the oldest and best men in the office. It is so yet; if an operator has been tried for years and has the confidence of the management, his word is taken and justice given him.

Our new management is all that could be desired, is liked by all the better class of men, and all grievances are settled with justice to all.

The only injustice I have heard of is of a pecuniary nature and is hard to right, and not under the control of the operating-room management. It is really no grievance, as the policy of the corporation is the same all over, and has been for years.

As the writer has been closely connected with the night force for years, he can say that the office is presided over by as genial and fair-minded a body of gentlemen as the telegrapa fraternity can boast of, and in no single case is an appeal not granted. Messrs. Lloyd and Holligan are gentlemen of sterling worth, and I am sure no injustice that they were cognizant of would be tolerated, and that any of my fellow-operators will gladly concur in this sentiment I can safely state.

Our present chief operator's policy, economical though it be, is of the most pleasant character to employés, and one hears frequent laudations, except from those who are vulgarly called "chronic kickers." If one would stop and think how he would act were he placed in the position, he would quietly subside and try to make it as pleasant for his superiors (in rank) as they do for him.

I cordially invite your correspondent "X. Y. Z." to constitute himself a health inspector and investigate the ventilation question. I sit by a window night after night, and I have not had a cold this season. Also come up and interview the operators themselves regarding unfairness and injustice. We are all content, so far as our officers are concerned, and hardly like the impression your note implies, or would lead others to form. 5 OR 6.

CHICAGO, Jan., 1883.

Chicago Chat.

To the Editor of The Operator and Electrical World:

SIR: During the past week a number of incidents have occured, of no particular importance, but which may be of interest to your readers elsewhere who have an acquaintance in Chicago.

The winter has been favorable for sleighing and skating parties, and, judging from the amount of red flannel neckwear in use, many have doubtless been indulging in midwinter pastimes.

Our old friend Mr. John Campbell, of Pittsburgh, paid us a visit on the 14th ult., and met with a hearty reception.

Mr. Huey, lately of Louisville, came in a few mornings since and apparently had been the victim of some of the West side "sand-baggers." Investigation proved he had simply been exposing his ears to the tender mercies of the winter's chilly blast.

Mr. Jacob Thompson has so far recovered from the typhoid fever as to be able to resume his duties and relate with evident satisfaction that (to operators) ever interesting account of "the most superlatively immediate transmitter he had ever, etc."

Rumor has it that Col. Harris has been speculating considerably of late. He sold heavily on an advancing market, but on confidential advices from some of "the Clique," covered at a loss of a few hundred.

Mr. T. G. Winnett, of the Baltimore & Ohio Company's office, has resigned, and been appointed manager of the Mutual Union office at Kalamazoo, Mich.

Quite a number have joined the "Knights of Maccabees," and efforts are being made to start a "tent" composed principally of telegraphers.

Mr. D. S. Anderson, assistant manager of the Western Union office, has been East on a visit. The climate does not seem to agree with him, as he came home sick.

Messrs. F. E. Bacon and F. G. Dickinson are among the recent acquisitions to the Western Union force. Miss Wicker and Miss Valentine have been transferred from the Metropolitan to the main operating room.

Mr. W. H. Leith, of St. Louis, is with the B. & O.

Mr. C. H. Butterfield is taking night press reports for the *Herald*. I. C.

CHICAGO, Feb. 5, 1883.

Telegraphy in the Northwest.

To the Editor of The Operator and Electrical World:

SIR: The Western Union line reached this place (Bozeman, Mont.), *via* the Northern Pacific Railroad, Jan. 9, and opened an office for business the same day. Through the courtesy of Mr. Davis, of the Military line, the company has its office in the same room as the latter. This is not only very convenient, but saves the Western Union Company a monthly rental of fifty dollars. Rents are very high here, ground floors renting all the way from $125 upward. Mr. G. C. Hazletine, well known out this way as the man who is always at the front in the construction of the road, opened the office. Mr. G. F. Goodhue takes charge of the office, Mr. Hazletine going back to Minneapolis until track laying is resumed in the spring.

The Military line is under the supervision of Mr. G. W. Davis, of the Signal Corps, a first-class operator and courteous gentleman from the land of palmettos and oranges, *i.e.*, Florida. I understand he contemplates giving up telegraphy and returning to Florida, to enter a more congenial and remunerative business. There is certainly a satisfaction in working for one's self. The result of energetic work then accrues to the worker, while in telegraphy the laborer has to be content with a sop, the company taking the substance.

Six months ago there was not an operator here, save the one employed on the Military line. Now I can count a dozen; some in other occupations, some waiting for "something to turn up."

Bozeman is the only town west of Bismarck that answers to anything like civilization. It is an old settled town of about 3,000 inhabitants, situated in the Gallatin Valley, shut in all around by mountains, but surrounded by a good agricultural country, well watered, with good coal mines, and doubtless also a certain amount of minerals.

One of the old-timers here tells the following: Some years ago, he says, he was working in New Orleans, and George Eitemiller was working in the same office. One night while waiting for Eitemiller to get through his work, the latter called him over to hear the operator at Memphis trying to "rush" him. "Just wait till he is through," said Eitemiller, "I have thirty-five or forty for him." After Memphis had finished without being once broken, Eitemiller opened on him. The gait from the start was terrific. After sending a message, or part of a message Eitemiller, without a pause, changed to the international alphabet, causing the Memphis man to break. After sending ten words or more, this was repeated, and Memphis had to break again; claiming, this time, that he got the "back stroke" of the instrument. The same thing was repeated until the man in Memphis had changed to every sounder in the office. During all this time the sender kept taunting him with such remarks as "You can't take what you try to send;" "Are there any more like you in the office?" etc. To add to the poor fellow's discomfiture, Eitemiller finally sent the remaining messages very slowly, remarking that under the circumstances they would both get through sooner by his so doing. To those unacquainted with the International alphabet it may be mentioned that, to uninitiated ears, it does sound like the phenomenon called the "back stroke."

In conclusion, I would urge operators who have the "Western fever" to stay at home. Under the munificent management of the Western Union, as administered by Superintendent Green, at St. Paul, wages are scarcely any better here than in the East, while the cost of living is about 200 per cent. higher. As the saying is, we pay mining camp prices for everything and receive Eastern wages. Times at present are dull, owing to the suspension of railroad construction, caused by the cold weather.

BOZEMAN, Mont., Jan. 17, 1883. KENO.

The Boston Telegraph Operators' Ball.

To the Editor of the Operator and Electrical World:

SIR: The first grand ball given by the operators of Boston took place on Friday evening, Feb. 2, at Odd Fellows' Hall, and was a pronounced success, both socially and financially. There was a large attendance of elegantly attired ladies; the gentlemen appeared in full-dress suits. Shortly after 9 o'clock, Superintendent Roche, Manager C. W. Henderson and Night Manager Alderman E. F. Leighton arrived and were assigned seats on the platform commanding a full view of the spacious hall. The grand march was led by Floor Manager Marshal Fleming, who was followed by the various committees. At midnight an intermission for supper was announced. The banquet hall was beautifully illuminated, and the supper was bountiful in its proportions and well served. After supper dancing was resumed and continued until 4 A. M. The presence of so many telegraphists—a number of whom came from various parts of New England and New York City—was exceedingly gratifying to the management, and every exertion was made to render the occasion a memorable one. The Reception Committee was generous in dispensing its hospitality. After the festivities in the ball room were ended, the guests were conducted to a convenient hotel where the remainder of the early morning was spent in general conviviality. New York City was represented by Messrs. Marvin, Keliher, Coady, Dwyer, Parmelee and Mr. B. Miller. Mr. E. J. Connor, chairman of the Reception Committee, took particular care that the resident operators who attended the ball should be promptly in their places at the usual time, in order that the service of the various companies should not suffer from the effects of the reception on the boys; all of whom, be it said to their credit, observed perfect order throughout the entire evening.

Congratulatory telegrams were received from New York, St. Louis, Pittsburgh, Cincinnati, Buffalo and Worcester. The organization has determined to appoint a permanent committee for the purpose of arranging a series of entertainments. UKNO.

BOSTON, Feb. 5, 1883.

Annual Reception of the Hornellsville Telegraphists.

To the Editor of The Operator and Electrical World:

SIR: The second annual reception given by the telegraphers of this city, on Wednesday evening, Jan. 31, was a brilliant success. Delegations were present from many points along the line of the Erie Railroad, nearly every office being represented. The decorations of the hall were extensive and elaborate. The floor was covered with duck, and rich upholstered furniture ornamented the sides of the hall. The gallery, orchestra stand and windows were draped with lace curtains, lambrequins, raw silk, etc. A telegraph line was erected around the hall, and booths containing telegraph instruments in working order were placed in each of the corners. Elegant booths of raw silk and lace were also erected in the centre of each side of the hall, from which water was served by courteous attendants. Cages of canary birds were suspended from each of the large chandeliers, and their sweet singing added much to the enjoyment of the evening.

The grand march was started at 9:30, with nearly 125 couples in line. Each lady and gentleman was presented with a handsome prog amme, accompanied by a beautiful *boutonnière*, bearing a neat card inscribed "Compliments, Telegraphers, 1883." The orchestra was superb, and the music elicited much praise. We nearly overlooked one or two important features of the occasion, viz., a telephone line, which was connected with the exchange; also the floral decorations, tropical plants and flowers in bloom, which were placed in various parts of the hall and were much admired.

The supper was served at the Delevan House, and was very elaborate. Nearly 200 couples were present during the evening, and dancing was indulged in until 4 A. M. Great credit is due the management of the affair, and especially to Mr. C. D. Yost, the secretary, for their untiring efforts to make this reception what it has proved to be—a grand success. Among those present from other places were: Mr. J. E. Riley, Miss S. B. Riley, Mr. and Mrs. Clarence Parker, Messrs. M. J. Kain, G. M. Giurdosy, D. Becker, F. Stewart, C. F. Lantry and G. A. Heller, Elmira, N. Y.; Messrs. J. O. Brien, John Cumming, J. McManus, David Kane, J. E. Brick, J. Harding, Miss Annie Connelley, Miss Sadie Higgins and Miss Haggerty, Bradford, Pa.; Mr. E. Crowley, Mr. Charles C. Frank, Miss Ella Witley and Miss Maggie Welch, Cuba, N. Y.; Mr. M. Fuller and wife, Cattaraugus, N. Y.; Mr. Thomas McManus, Miss Allie Fisher and Mr. J. M. Magee, Kendall, Pa.; Mr. J. M. Harty, Miss N. C. Dow and Mr. George Wheat, Corning, N. Y.; Mr. J. B. Fiske and Miss Belle Richardson, Waverley, N. Y.; Mr. J. A. Headley, Miss Estella Butts and Mr. H. V. Brown, Susquehanna, Pa.; Mr. W. W. Neville and Miss M. G. Kennedy, Bingham on; Mr. W. H. Lemen and Miss Minnie Lemen, Dansville; Mr. W. J. Mack, Mr. Harry Paxton and Miss Lizzie Northrup, Addison; Mr. J. E. Hempstead and Miss R. Santee, Mr. G. Sunnett, and Mr. D. W. Hempstead, Pond Eddy, Pa.; Miss Ella Webb, Woodhull; Mr. C. J. Crandall, Scio; Mr. Fred. Shaut and wife, Canisteo; Mr. W. J. Watson and Miss Susie Palmer, Carrollton; Mr. M. McTigh and Miss Rose McTigh, Andover; Mr. O. O. Rew and Miss Delia Wellman, Friendship; Mr. J. F. McCormick, Attica; Mr. D. E. Scranton, Perry, N. Y., and many others. Letters of regret, etc., were received from General Passenger Agent J. N. Abbott, Supt. C. Neilson, Mr. W. J. Holmes and others.

HORNELLSVILLE, N. Y., Feb. 3, 1883. * * *

THE ELECTRIC LIGHT.

BOSTON, MASS.—The American Electric Illuminating Company is making contracts for putting in new boilers, engines and dynamo machines in Boston. It is announced that, within sixty days, it will undoubtedly be running between four hundred and five hundred lights in that city.

A NEW LOCAL COMPANY.—An electric lighting company for Hoboken, N.J., has been organized under the State law, with a capital of $150,000, and it is understood that an effort is being made to secure contracts with the Mayor and Common Council for the lighting of the entire city by electric lamps.

IRONTON, O.—Mr. Curtis, of the Brush Company, was in Ironton on Jan. 27, for the purpose of interesting the citizens in the formation of a local company to introduce the Brush light. A committee of citizens was organized to canvass the city for the purpose of ascertaining how many persons would use the light.

LIGHTING VESSELS.—One advantage of lighting vessels by electricity was satisfactorily demonstrated on the night of Jan. 30, when the steamer Carolina, of the Old Bay Line, between Baltimore and Norfolk, ran into the British steamship Riverdale in a dense fog off Cedar Point, on Chesapeake Bay. The electric lights of the Caroline were extinguished only in the damaged part of the boat, and her officers think that if she had been lighted in any other way a conflagration would have followed the collision.

ELECTRICITY VS. GAS—A PRACTICAL TEST.—On Feb. 3 an electric light in front of the store of Adolph Zabinski, in Jersey City, used for illuminating the show windows, burned dimly, and Mr. Zabinski directed one of his most careful employés, a young woman, to light the gas in the window. In doing so, a spark from the taper she used fell on some lace. The fire spread so rapidly in the inflammable material of the store that the clerks had to flee for their lives. The flames were not subdued until they had consumed nine stores and two dwellings, causing a loss of $125,000.

THE ELECTRIC LIGHT IN FALL RIVER, MASS.—Certain leading gentlemen and capitalists of Fall River have associated themselves as the nucleus of a company to introduce the electric light into Fall River and vicinity, and subscribed the stock necessary for the business. They met on the 1st inst. to organize the company, and their policy is to form a branch of the American Electric Company, which has control of the Thomson-Houston system. There is a wide-spread desire to try the electric system of lighting, and a large number of persons and several manufacturing companies are ready to give it a trial.

WHAT ARE WE COMING TO?—Among the novelties at the forthcoming Electrical Exhibition at the Westminster Aquarium will be, says the London *World*, some fancy dresses, the trimmings of which are all effected by electric light. M. Pilotel is now engaged upon the designs, which promise to be most original. Each dress is embroidered with fine wires, connected with innumerable small incandescent lamps. The main wire is carried down to the heel of the boot, which, coming into contact with a prepared carpet or floor, is charged with the electric current, and the trimmings of the dress are at once illuminated. It is intended to introduce these dresses on the stage in London, Paris and Vienna. The inventor says their application is simple and attended with no danger.

TELEPHONE DEPARTMENT.

APPOINTMENT.—Mr. E. B. Wild, late of Fond du Lac, Wis., has been appointed manager of the Faribault (Minn.) telephone exchange.

ADVANCE IN TELEPHONE STOCK.—The feature of the week has been the remarkable advance in American Bell Telephone stock, which rose from 217, as reported in our last issue to 298, at which it is quoted to-day.

A NEW EXCHANGE.—The Iowa & Minnesota Telephone Company has opened an exchange at Storm Lake, Iowa, a popular summer resort, frequented by anglers and those who enjoy field sports. The town has a population of 1,800, and the exchange opens with 36 subscriber.

TELEPHONE *vs.* TELEGRAPH.—The recent reduction of telegraph rates in New England is said to have been made for the purpose of meeting the telephone competition in that section, all the New England towns being now united by a network of telephone lines over which conversations may be held by anyone on the payment of a small toll.

THE TELEPHONE CALL.—A writer in a daily paper observes that, although the salutation "hello!" is not an elegant expression, it seems to answer the purpose perfectly. The combination of consonants and vowels is such as to create a distinct impression upon the instrument, and the accent coming strongly upon the final o, aids very much in this effect. In some exchanges attempts have been made to substitute a more polite word, but as yet there has not been found any word of greeting that answers as well as "hello."

THE AMERICAN BELL TELEPHONE COMPANY.—The Committee on Mercantile Affairs of the city of Boston gave a hearing, on Feb. 1, at the State House, on the petition of the American Bell Telephone Company, for the repeal of that portion of its charter which prohibits it from owning more than thirty per cent. of the capital stock of any other corporation doing a cognate business, or licensed by it to do telephone business. Gen. P. A. Collins and Mr. E. P. Brown represented the company, no one appearing to oppose the granting of what was asked for by it.

PURCHASE BY THE AMERICAN BELL COMPANY.—Negotiations were completed in Boston, on the 1st inst., for

the sale of a majority of the stock of the Central District Printing Telegraph & Telephone Company, of Boston, to the American Bell Telephone Company, of Boston. The Pittsburgh Company had bought an immense district, covering Western Pennsylvania, Eastern Ohio and part of West Virginia. The capital stock of the company was $500,000, of which $342,000 was held by a syndicate, $145,000 by the Western Union Telegraph Company and the local exchanges. The Pittsburghers who were in the deal claim to have made $650,000 by the transaction.

DASHES HERE AND THERE.

SOMETHING NEW.—An incandescent pocket-book is the latest—it is always light.

ELECTION.—Mr. Charles D. Haines was recently elected president of the District Telegraph Company of Cleveland, O.

DIVIDEND.—The Lehigh Telegraph Company declared a semi-annual dividend of 3 per cent. on Jan. 20, payable on and after Feb. 1.

A NEW TELEGRAPH COMPANY.—A license was granted in Chicago on Jan. 31, to Messrs. H. H. Evans, J. J. Curran and others to organize the Merchants' Union Telegraph Company of Chicago; capital $500,000.

UNDERGROUND WIRES IN NEW JERSEY.—A bill passed the New Jersey Legislature on Jan. 30 compelling all telegraph companies running wires on poles through any city to take down the same and put them underground within two years from the passage of the bill.

A NEW BALTIMORE ENTERPRISE.—Mr. Otto Mergenthaler, formerly with the well-known firm of Messrs. A. Hahl & Co., has established a new electrical enterprise at 12 Bank Lane, Baltimore, where he proposes to make a specialty of electrical and meteorological instruments.

GIFT TO TELEGRAPH MESSENGER BOYS.—Mrs. James Coates has again remembered the messenger boys of the Western Union Telegraph Company at Providence, R. I., by presenting them with thirty volumes of excellent reading matter for perusal during their leisure moments. The lads are very grateful to their generous benefactress.

THE NEWHALL HOUSE FIRE.—The Coroner's jury rendered a verdict in the investigation of the Newhall House disaster late last Monday afternoon. They found the owner of the house guilty of negligence in not having provided more escapes in case of fire, and also found fault with the network of telegraph wires surrounding the hotel.

UNDERGROUND WIRES IN BROOKLYN.—The authorities of Brooklyn are considering the propriety of taking measures to compel the telegraph and telephone companies to place all their wires under ground. A letter sent by the Mayor of Milwaukee to Commissioner Ropes, of Brooklyn, asserts that more lives would have been saved at the fire at the Newhall House if the telegraph wires had not impeded the operations of the firemen.

TAXING WIRES IN PHILADELPHIA.—A general ordinance now before the City Councils of Philadelphia, regulating the introduction and use of underground systems, imposes a tax of $5 per mile for each suspended wire for electric lighting purposes, and $2.50 for wires for telegraphic service, and for all wires under ground $2.50 per mile; and also a license charge of 5 cents per running foot on all underground tubes or pipes between 6 and 12 inches diameter, and of 10 cents where they exceed 12 inches.

MR. EDISON'S PATENTS.—In reply to a correspondent we would say that it is difficult to give the exact number of patents granted to Mr. Edison, as his patent work has been done for so many different interests and by so many different patent solicitors. It was estimated, a short time ago, that Mr. Edison had received 348 United States patents. The greatest number issued to him in one day was 31—on issued Sept. 19, 1882. The greatest number that Mr. Edison has applied for in one day was 61 cases, filed the early part of last August. Mr. Edison has from 200 to 225 cases now pending in the Patent Office.

THE MUNICH AND VIENNA ELECTRICAL EXPOSITIONS.—The only American exhibitors who have received diplomas from the Munich Exposition are the Electro-Dynamic Company, of Philadelphia, which exhibited electric motors, and Messrs. Cumming & Brinkerhoff, of New York, for their disc electrodes. No medals were granted to exhibitors. The American electric light companies were represented by their European agents. Exhibits for the Vienna International Electrical Exposition, which opens on Aug. 1, 1883, should be entered before March 1. Forms for this purpose can be obtained of the Austrian consul.

STOCK QUOTATIONS.—Telegraph, telephone and electric light stocks were quoted as follows on Wednesday:

	Bid.
Western Union Telegraph	81¼
Mutual Union Telegraph	21
American Cable	66½
Mexican Telegraph	130
Central & South American Telegraph	95
American Bell Telephone	298
Edison Electric Light	375
U. S. Electric Light	130
Swan Incandescent Electric Light	175

T. M. B. A. ASSESSMENT.—Assessment No. 161, dated Feb. 1, has been issued by the Telegraphers' Mutual Benefit Association. It announces the death of Mr. Jacob R. Kolb, at Laredo, Texas, on Dec. 3, 1882, of typho-malarial fever, the claim arising from which will be paid from the surplus; and of Mr. William Martin, of Boston, Mass., on Jan. 4, of acute pneumonia. One dollar is due to meet this assessment, from members holding certificates up to and including No. 4,354. The number of members of the association in good standing is 2,375 in the first division and 147 in the second division; net increase in membership since last assessment: first division, 21; second division, 3.

KILLED BY A TELEGRAPH POLE.—Five boys were at play on the 3d inst. in an open lot at Thirty-fifth street and Twelfth avenue, this city, that is used as a storage ground for telegraph poles. The boys were James Hogan, aged eight; James Gardner, aged thirteen; Thomas and Patrick Keely, and a boy whose name is not known. A long telegraph pole lay on a truck without support or fastening. The boys got upon it. They set it in motion and it rolled off the wagon. The boys were thrown to the ground and the pole fell upon them. Hogan's head was crushed and he died almost instantly. Gardner's foot was smashed so badly that it will have to be amputated. The unknown boy's leg was scraped and hurt. The others escaped.

A LINEMAN FINED.—John Hewson, a telegraph line repairer in the employ of the Baltimore & Ohio Railroad, was taken before Justice Gardner, at the Jefferson Market Police Court, on the 3d inst., on complaint of Joseph Crocherou, the proprietor of the Brower House, at Broadway and Twenty-eighth street, who charged him with trespass. The complainant said that he found Hewson on the roof of his hotel, working at the telegraph wires which crossed the roof. He told the magistrate that he had been greatly annoyed by men trampling over his roof while stringing telegraph wires. The Justice imposed a fine of $10 upon the prisoner, and in default of payment caused the man to be locked up.

THE "BUCKET SHOPS" DEFEATED.—The case of Nohe against the Western Union Telegraph Company and Board of Trade was decided by Judge Moran, of the Circuit Court, at Chicago, on the 2d inst. Nohe is the proprietor of a "bucket shop," and filed his bill to enjoin the telegraph company from removing its tickers from his establishment and from withholding market quotations as they exist on the Board of Trade. The Court gave an elaborate opinion sustaining the right of the telegraph company to withhold the market quotations upon the ground of the immorality and illegality of the business in which the complainant was engaged. This was a test case, the attorneys of all the bucket-shops taking part in the argument.

NEW YORK CITY ITEMS.

Echoes from 195.

Messrs. Whittaker, Dewees and Shiels are on the waiting list.

Messrs. H. D. Morrison and M. J. Landy are working on "split trick."

Chief F. W. Gregory was absent a few days this week, owing to a sudden illness.

Mr. James McParland, of the marine department, has been absent for a week, on account of sickness.

Mr. J. E. Foley (formerly of 195) and wife are going to spend the balance of the winter in Florida and Nassau, N. P.

The late storms in the West, by causing a scarcity of wires, have retarded the experiments with the Wheatstone system.

Mr. Peter J. Morrison has returned from an extended visit to Bainbridge, Ga., where he has landed interests and hosts of friends.

The delegation to the Boston telegraphists' ball, consisting of Messrs. Dwyer, Keliher, Coady, Miller, Parmelee and T. Marrin, returned Monday morning, and report that they had a most enjoyable time.

Facetious New Yorker (dropping his aspirates) to an English cousin—"What's the 'itch with your W'eatstone happaratus, Mr. ——?" English cousin—"The itch? Ha! Ha! Oh, the apparatus hasn't come to the scratch in Buffalo yet, you know!"

The "waiting list," as the name indicates, is the list in which the names of operators who have passed a trial test as to ability, etc., are placed, when there is no immediate vacancy, and the operators are willing to wait until there is one. In the meantime they are allowed to work as substitutes, or for the company as extra, when required.

The recent storms completely prostrated the western wires, not leaving one wire west of Buffalo. Three wires were secured via Albany, one via Syracuse, and one via Boston to Montreal, Toronto and the West. Western Chief Stewart speaks very highly of the admirable manner in which Montreal and Toronto met New York at every point, thereby enabling New York to dispatch a great deal of business which otherwise would have been seriously delayed.

The publicity given to the successful attempt of Mr. W. S. Walcott to eat a brace of quails daily for thirty days has started a mania for feats of gastronomy, which has reached the Western Union lunch room. Mr. J. T. Stephenson has undertaken to eat a regulation slice of cocoanut pie, at lunch, for 60 consecutive week days, beginning Feb. 1. If he accomplishes the feat, Messrs. Baldwin & Dillon agree to present him with a lunch ticket. At present the pie is a prime favorite.

Other City Items.

Mr. P. J. Carroll, formerly of the Western Union, is now manager of the Mutual Union office at 1,209 Broadway.

Mr. Robert Tomes has resumed his former position as manager of the American District telegraph office at 165 Church street.

The Manhattan District Company has decided to open a branch office in the neighborhood of Forty-seventh street and Sixth avenue early next week.

Mr. Charles Porter, late assistant superintendent of the Manhattan District Telegraph Company, has gone to Boston, to accept a similar position there.

Nine persons were arrested in New York last week on a charge of malicious mischief, for tampering with the fire-alarm telegraph, and sending out false alarms of fire.

Mr. Benjamin Audubon, formerly manager of 666 Sixth avenue office, and now manager of the Morristown (N. J.) office, was in the city last week, visiting his friends.

We regret that the time of our going to press does not allow us to give a report of the New York telegraphists' reception, which took place at Ferrero's Assembly Rooms last evening. We will do so in our next issue.

The Brush Electric Light Company has been temporarily enjoined, by Judge Donahue, of the Supreme Court, from erecting a pole in front of the store of Messrs. E. Ridley & Sons, on Grand street. The arguments will be heard on Feb. 12.

PERSONAL.

WAVERLEY, N. Y.—Mr. H. T. Brown has been promoted to the position of train dispatcher of the Lehigh Valley Railroad, vice Mr. T. H. Mathew, removed.

CHICAGO.—Mr. William Darrach, of the Western Union office, while skating, some weeks since, was sounfortunate as to fall and break his right arm. He is now able to resume his duties.

TORONTO, ONT.—Mrs. Budge, of the Great Northwestern Telegraph Company's office, was recently presented by her fellow employés with a diamond brooch, on the occasion of her leaving the company's service.

THURLOW STATION, P. W. & B. R. R.—Mr. E. M. Spear, who has been operator at Thurlow for a long time, has left to accept the position of manager of the Western Union office at Bellefonte, Pa. His departure is much regretted by his associates. Mr. Jos. E. Taylor, Jr., takes his place.

KANSAS CITY.—Miss Lizzie Thompson returned to her home at Selina, Kan., on Jan. 27, on account of illness. Mr. C. J. Cornell was granted leave of absence Jan. 30, owing to serious illness of his mother. Messrs. E. O. Hildebrand and Will T. Parry have resumed work in the Kansas City office, after an absence of several months. Mr. S. J. Bigger, manager of the Union Depot office, is seriously ill at Aledo. Mr. Frank Bigger, his brother, has been summoned to Aledo.

MILWAUKEE.—A new rule, deducting one cent a minute from the time of each operator when tardy, went into effect in the Western Union office on Jan. 1. Judging from the appearance of the time slips each morning, some of the operators came out pretty short last month. A new switch-board has been ordered for the office with capacity for 75 wires. Mr. Evan G. Thomas has been appointed Sunday chief, in place of Mr. E. A. Patterson, who has been transferred to Madison to assist during the session of the Legislature. The Mutual Union and C. & M. telegraph companies, whose offices were destroyed in the Newhall House fire, are now located at 113 Michigan street. Mr. W. H. Kelsey, city superintendent of the telephone exchange, was recently presented with a son. Mr. Kelsey is not superintendent of the telephone company for the entire State, as was recently stated, Mr. A. S. Hibbard being superintendent of the lines outside of Milwaukee. 30.

IRONTON, O.—Mr. W. W. Pritchard has tendered his resignation as manager of the Western Union Telegraph office at this place, the resignation to take effect March 1. Mr. Pritchard has had charge of the Ironton office something over eleven years. He has been in the service of the Western Union as a managing operator for nearly 21 years, and is now the only remaining operator of those employed on wires Nos. 13 and 16 when he came here in 1871. Mr. Pritchard's association with the citizens and business men of Ironton has been the most pleasant, and his office has always shown concise and favorable reports. Of the $50,000 worth of business done by the station under his management, only about $60 was ever lost by non-payment of debts. In retiring, Mr. A. A. Montgomery, the present assistant manager, has been recommended to fill the vacancy, and David Lewis, messenger, to fill Mr. Montgomery's place. These recommendations are backed by the signatures of prominent business concerns and the largest customers of the office. Mr. Pritchard expects to remain here, and for the present designs enlarging upon the manufacture and sale of his patent blank clip, which has a growing prospect and calls for more attention.—*Ironton Register.*

BORN.

BIENVENU.—On Jan. 15, 1883, to Mr. Albert Bienvenu, proprietor Attakapas Telegraph Line, St. Martinsville, La., a son.

MARRIED.

BIENVENU-RATIER.—At the residence of the bride's uncle, Mr. A. V. Fleming, St. Martinsville, La., Feb. 3, 1883, by the Rev. Father Jan, Mr. Raoul J. Bienvenu, operator Attakapas Telegraph Line, St. Martinsville, La., to Miss Mary Gabrielle Ratier, of St. Louis, Mo.

ELECTRICAL PATENTS ISSUED.

Week ending Jan. 23, 1883.

Automatic cut-out for electric lamps; William Hochhausen, New York	271,457
Circuits for multiple switch-boards for telephone exchanges; Charles E. Scribner, Chicago, Ill	271,279
Device for making and breaking electric currents; Robert W. Willson, New Haven, Conn	271,560
Electric arc lamp; Joseph R. Finney, Pittsburgh, Pa	271,576
Electric arc lamp; Edward H. Amet, La Grange, Ill	271,395
Electric arc lamps; William Hochhausen, New York	271,456-8
Electric motor; Adam Millar, Glasgow, Scotland	271,502
Galvanic battery; John A. Barrett, Chicago, Ill	271,299
Incandescent electric lamp; Alex. Bernstein, Boston, Mass	271,302
Mechanical telephone; George K. Farrington and Horace C. Farrington, Kirksville, Mo	271,324
Pipe for telegraph cables; William R. Patterson, Chicago, Ill	271,262
Pneumatic and electric clock system; Ludwig Mautner, Vienna, Austria	271,347
Secrecy switch for telephones; Charles E. Scribner, Chicago, Ill	271,280
Submarine telegraph cable; Samuel Trott and Frederic A. Hamilton, Halifax, N. S	271,548
Telephone system and apparatus; Charles A. Randall, New York	271,513

BUSINESS NOTICES.

The *Golden Argosy* is the title of a paper for young people, published by Messrs. E. G. RIDEOUT & Co., of No. 10 Barclay street, this city. It contains interesting reading matter and presents a handsome appearance.

The atttention of persons interested in local telegraph and telephone organizations is respectfully called to the electric lighting system of THE FULLER ELECTRICAL COMPANY; and the practicability of making arrangements with that company for the introduction of its apparatus, either in isolated plants, or through the formation of local companies desiring to engage in the business of electric lighting. The specially valuable features of this company's system may be seen by examination of its apparatus in Boston, Worcester, Providence, New York City, Brooklyn, Jersey City, Paterson, Philadelphia, Hartford, Lancaster, Scranton, Syracuse, Rochester, Buffalo, Pittsburgh, Wheeling, Steubenville, Xenia, Dayton, Grand Rapids, Chicago, Springfield, Belleville, St. Louis, St. Paul and many other smaller places throughout the country. Correspondence is invited. THE FULLER ELECTRICAL COMPANY;
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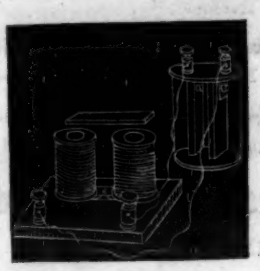

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Black-eyed Benie's gone to rest.	Dars one mo' ribber for to cross
Bride bells.	De beacon lamp am burnin'.
Bring the absent back to me.	The drunkard's dream.
Come and meet me Rosa darlin'	I cannot say good-bye.
Dar die ole sarpent was a crawlin'	In the gloaming.
Darling Daisy o' Dundee.	Is there no kiss for me to-night?
It is home where mother dwells.	
Jamie, are you coming?	
Meet me darling by the mill.	
My bonnie Jennie Lee.	
Over the garden wall.	
Patter of the shingle.	
The lassie tha' lo'es me so.	

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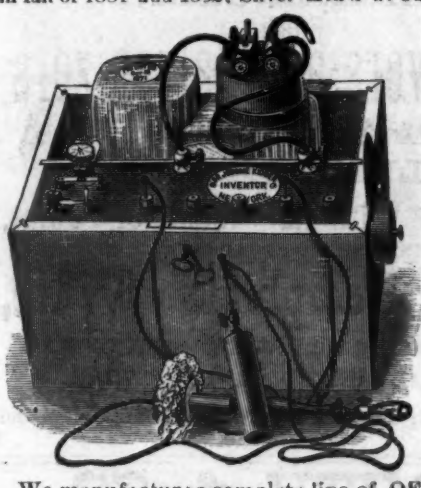

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to return the amount IN FULL if a cure is not effected within a given time. When this REFUND is requested, the PATIENT will only have to make an AFFIDAVIT (on forms supplied with guarantee) that he has worn the APPLIANCES as directed and for the specified time. IN making this offer we are consulting our own interests. THOUSANDS of persons in moderate circumstances have stated their willingness to try our treatment if a cure were guaranteed. They said, "We would give twice the amount you ask if we were certain we would be cured, but we cannot afford to lose the money, if we were not."

As to our responsibility, we are permitted to refer to the NATIONAL PARK BANK of this city. WE require from each person a brief statement of his case, giving SYMPTOMS, ETC., and AGE, so that we may be able to advise him what appliances are needed to effect a cure. WE have found WILSONIA an almost unfailing cure for CATARRH, INDIGESTION, DYSPEPSIA, CONSTIPATION, NEURALGIA, RHEUMATISM, NERVOUS DEBILITY, SLEEPLESSNESS and diseases of the LIVER and KIDNEYS. THESE are the forms of disease that the MAJORITY of persons who are out of health suffer from. WITH regard to ASTHMA, TIC DOULOUREUX, HEART DISEASE, and a few other obstinate diseases that usually baffle all medical skill, "WILSONIA" AFFORDS GREAT RELIEF, if it does not effect a cure, and the lives of this class of sufferers are comforted and prolonged.

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Catarrh!

Deafness!!

Dyspepsia!!!

Read About This Case.

NEW HAVEN, Conn., Nov. 15, 1882.

In my childhood I was troubled with catarrh which impaired my hearing. As I grew older both catarrh and deafness grew worse. Besides I have been a great sufferer from dyspepsia. On Nov. 15, 1881, I put on the Wilsonia Appliances and to-day I am entirely cured of dyspepsia and catarrh, and my hearing is restored. Language cannot express my gratitude for what "Wilsonia" has done for me.

THEODORE W. WARREN,
Twelve years with Winchester Arms Company.

Dr. Price, of Baltimore, Md., writes: "I have recommended 'Wilsonia' in a number of cases in my practice; they act very satisfactorily."

Dr. J. H. Demorest, One Hundred and Twenty-fifth street, N. Y., testifies:

Mrs. John Raynor, 137 East One Hundred and Twenty-sixth street, was cured in six months of chronic facial erysipelas, commonly called "St. Anthony's Fire," by Wilsonia Appliances, after the unsuccessful treatment by medicine.

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THIRD CHURCH,
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I have worn Wilsonia Appliances for several months for rheumatism in its most aggravated forms. Since putting them on I have been almost wholly relieved and have regained much of my former vigor and elasticity. I am grateful, indeed, for what they have done for me.

S. R. DENNEN, D. D.

259 NINTH STREET, Brooklyn, Oct. 21, 1882.

I am happy to say that, though I am seventy-one years old, your Wilsonia Appliances have made a new man of me. I had rheumatism in my knees, pain in the small of my back and cold feet. I am improving every day. ALONZO H. GALE.

A CURED DRUGGIST.

WICHITA, Kan., Oct. 29, 1882.

Last November I purchased a set of Wilsonia Magnetic Appliances. I had been a great sufferer from nervous prostration and rheumatism for ten years. I would be thrown into spasms every day, and sometimes three or four times a day. I have not had a hard spasm since, and for the last five months not a symptom of one. I can safely recommend them to any one suffering from nervous derangements or from rheumatism.

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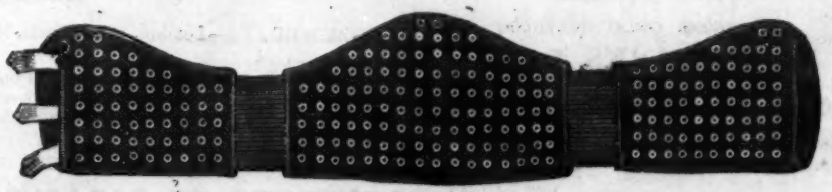

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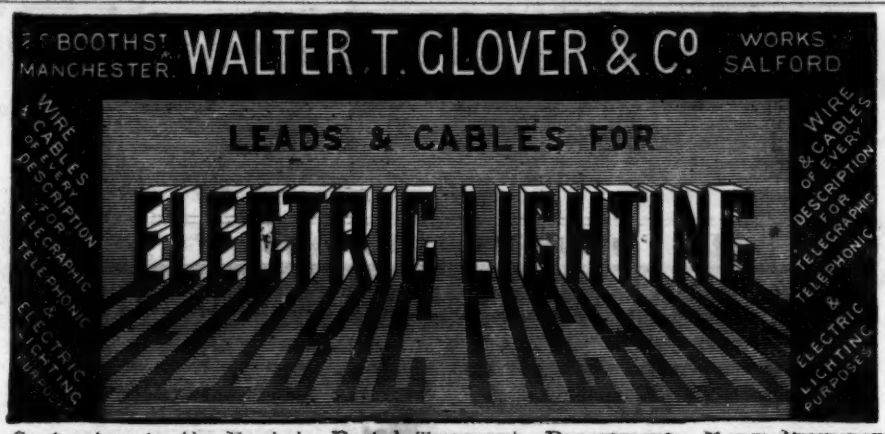
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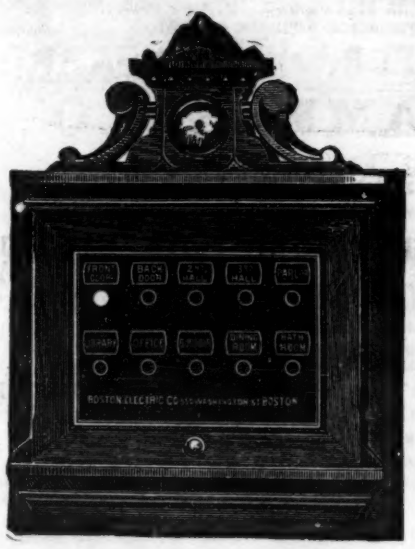

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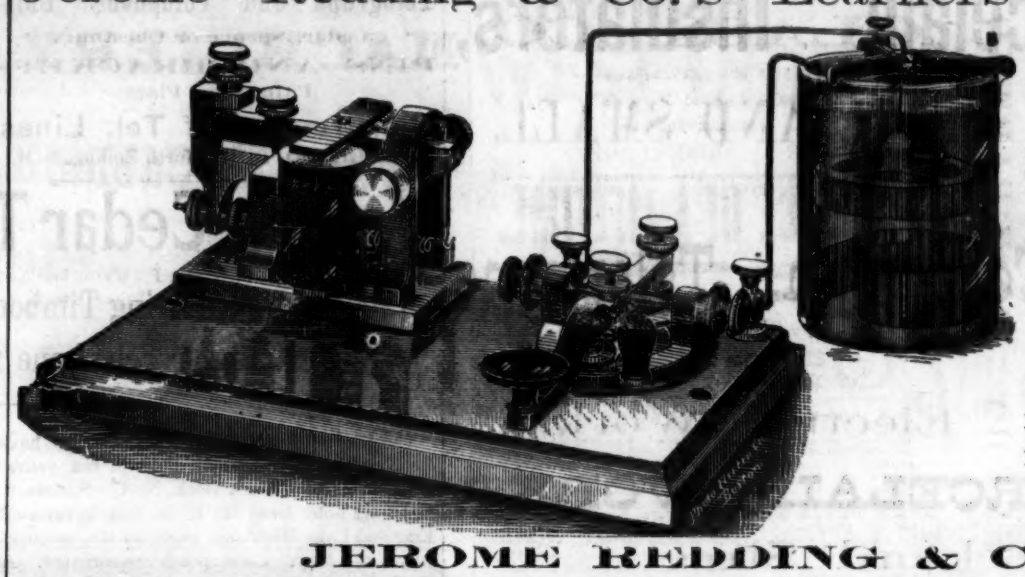

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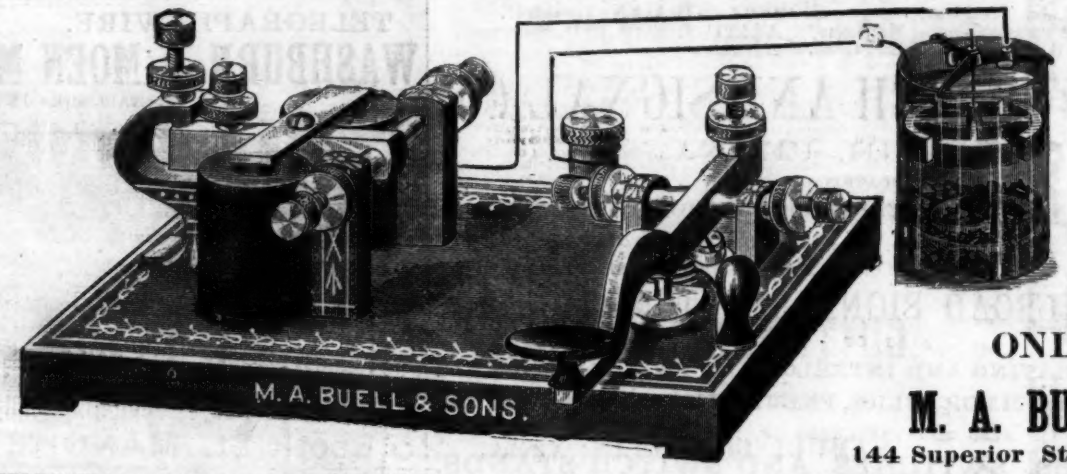

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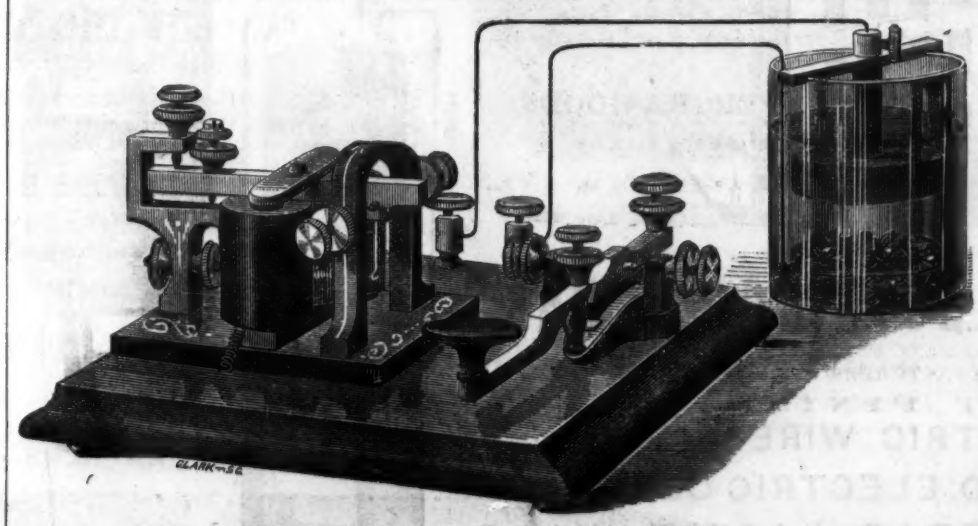

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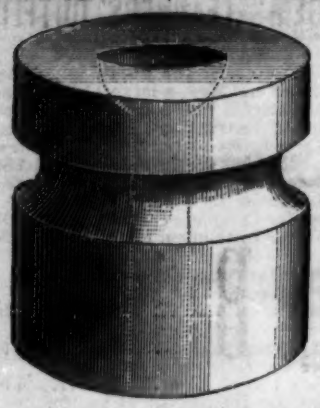

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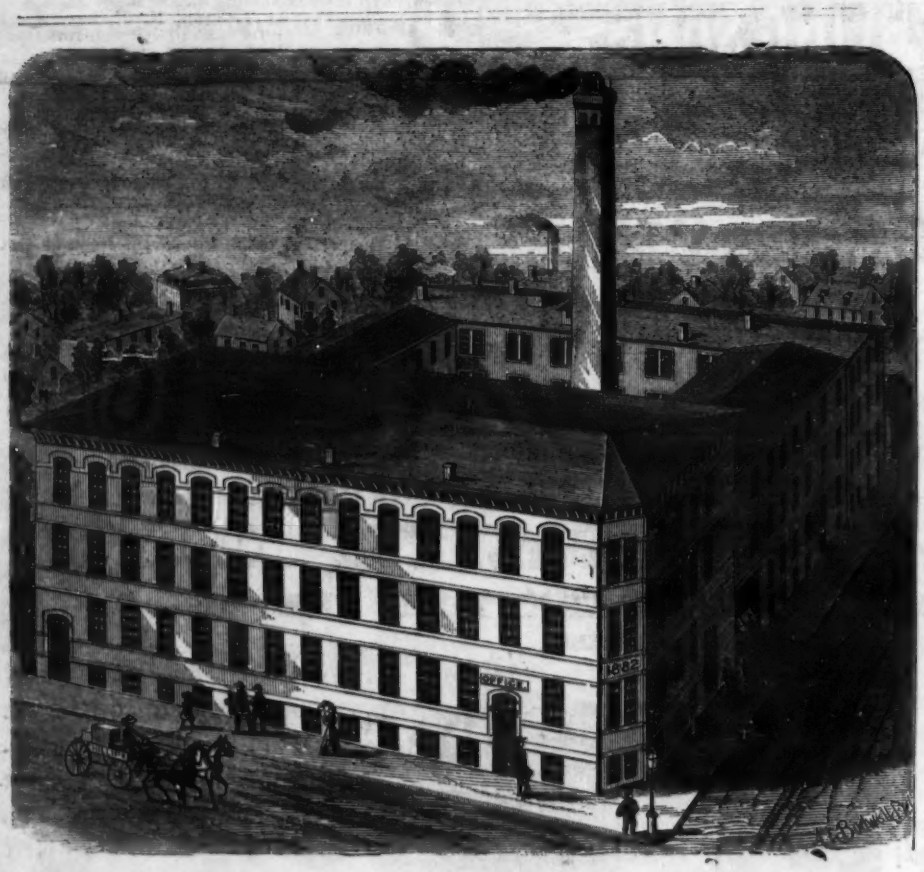

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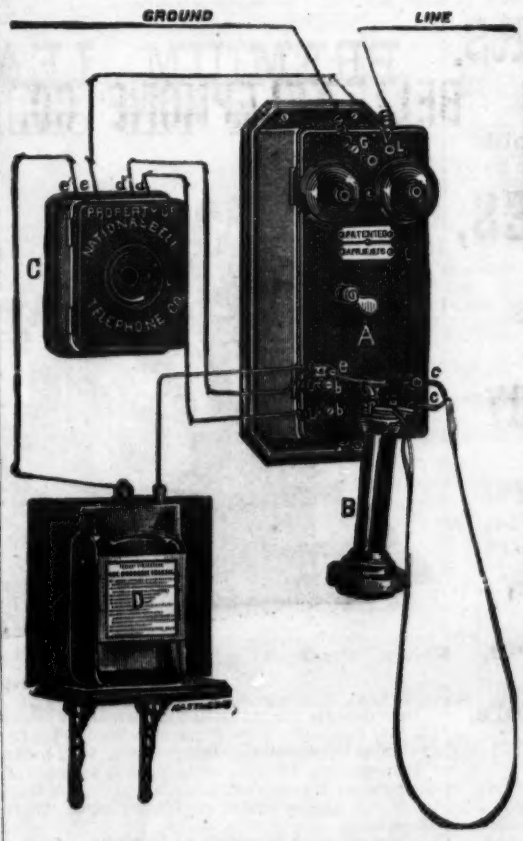

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KERITE INSULATION should be used on electrical conductors for any of the following purposes:

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some of them TWO MILES IN LENGTH, are in use in several cities, and are found to WORK PERFECTLY for that distance.

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SIZE OVER ALL, 7⅛ × 4¼ INCHES.

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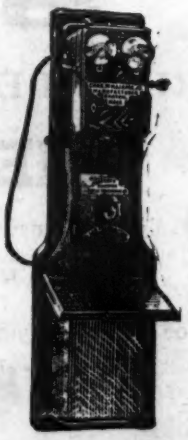

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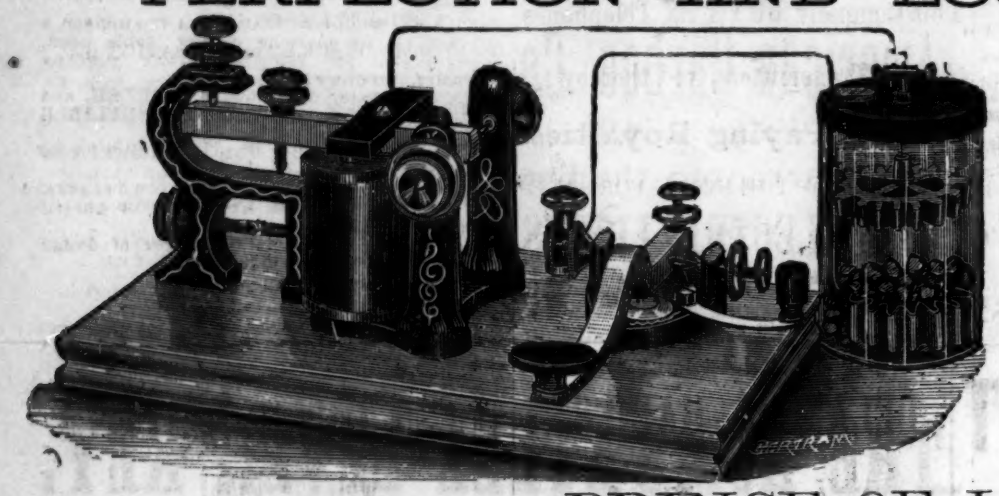

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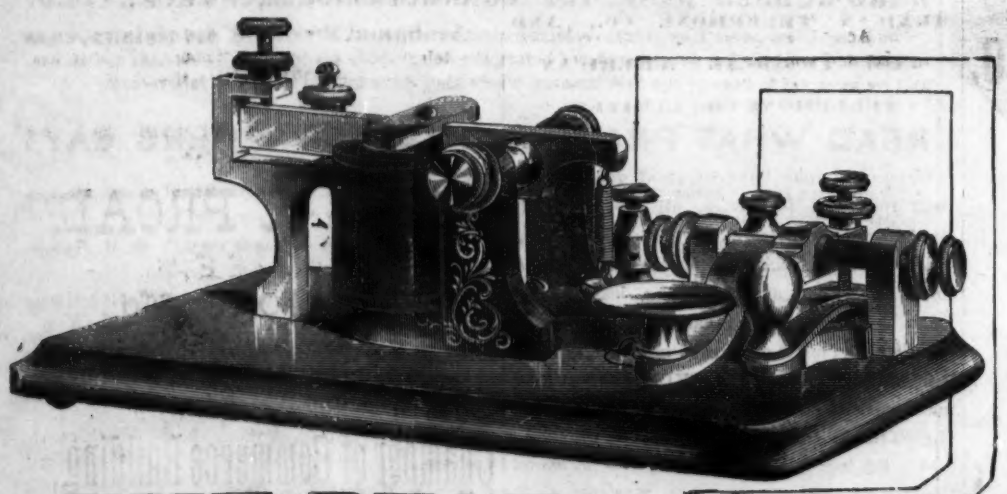

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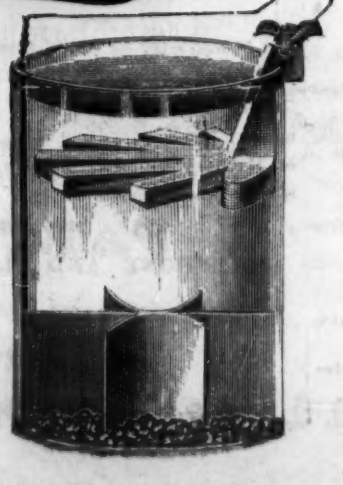

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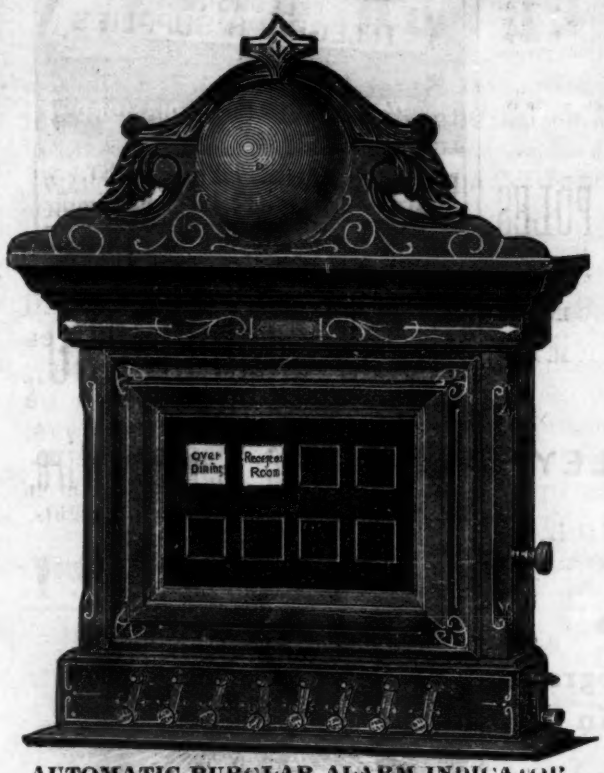

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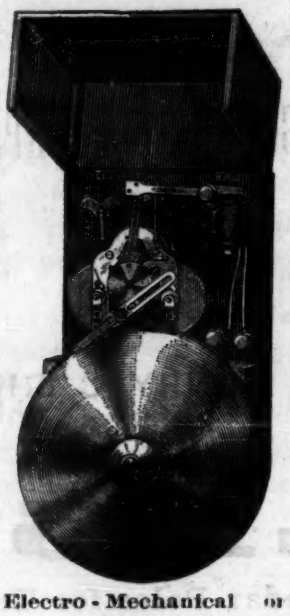

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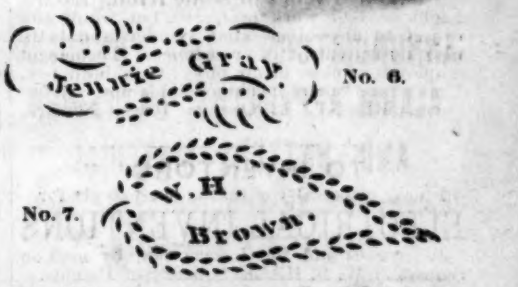

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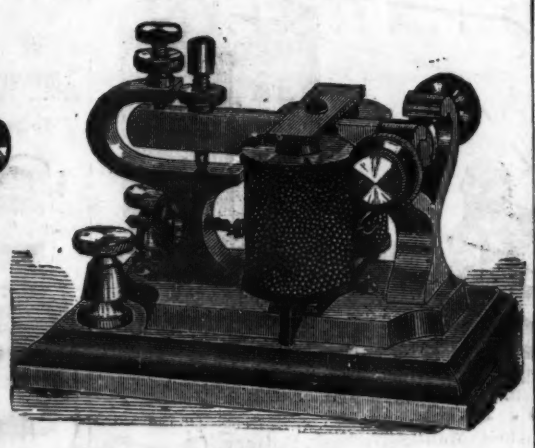

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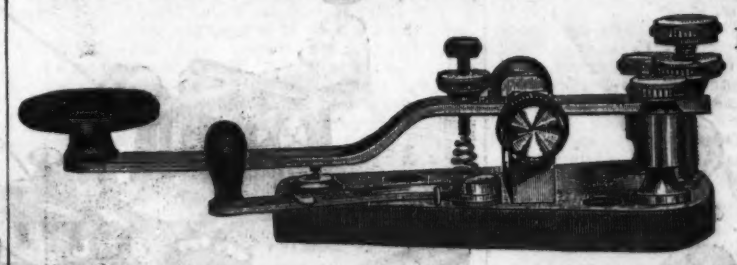

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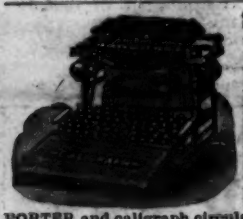

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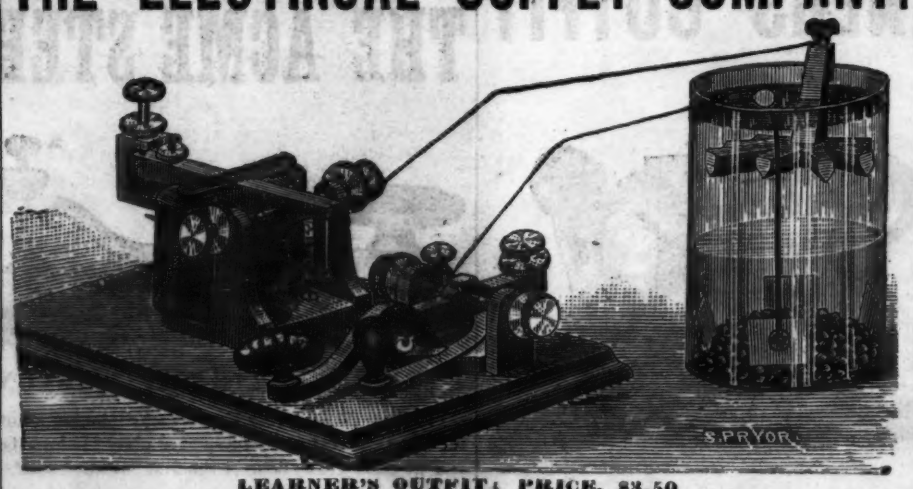

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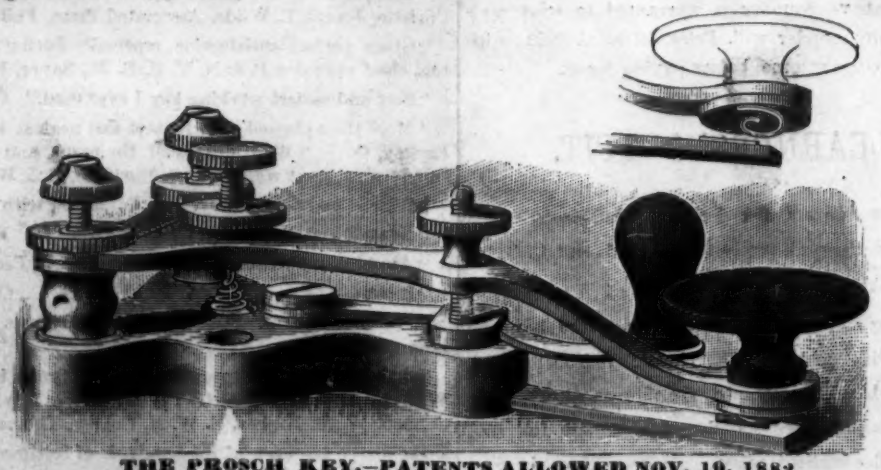

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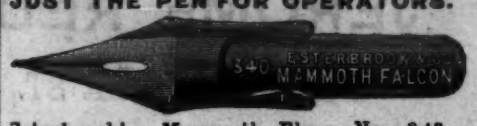

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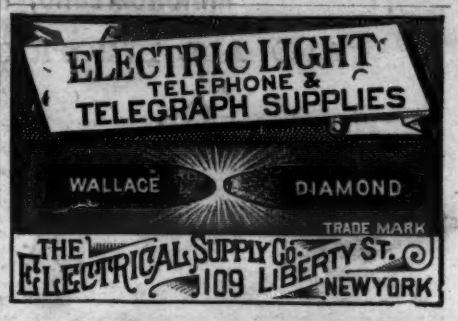

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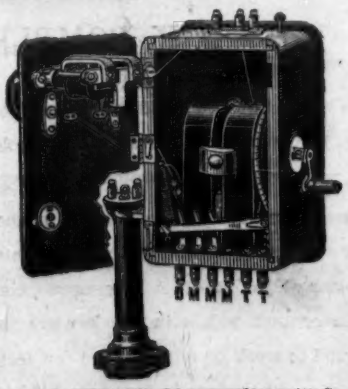

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